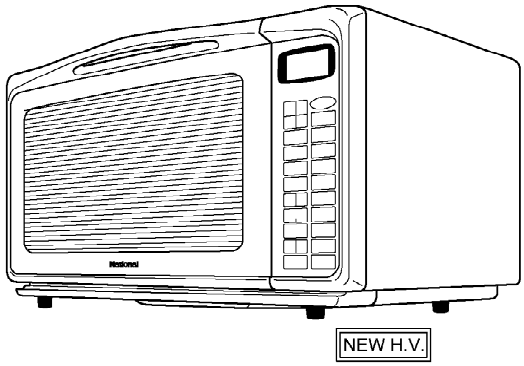
ORDER NO. MOD9812220C3

Service Manual

Microwave Oven

INVERTER SYSTEM INSIDE

NN-V688W / NN-V688WS / NN-V698J / NN-V698JS / NN-V668W / NN-V668WS



SPECIFICATIONS

Specifications

		KNQ MNQ	YNQ	SNM	HNE TNE XNE	WNT	LNK
Power Source:	(V)	240V	230-240V	220V	220V	110V	220V
	(Hz)	50 Hz	50 Hz	50/60 Hz	50 Hz	60 Hz	60 Hz
Power Requirement:	Microwave	1260 W					
	Heater	1340 W					
Output:	Microwave IEC-705-88	1000 W for HNE, KNQ, LNK, MNQ, SNM, TNE, WNT, YNQ models 900 W for XNE model					
	Heater	1300 W					
Microwave Frequency:		2,450 MHz					
Timer:		30 MIN (HIGH) / 99 min. 99 sec.					
Outside Dimensions:		312 mm (H) X 520 mm (W) X 400 mm (D)					
Oven Cavity Dimensions:		206 mm (H) X 373 mm (W) X 373 mm (D)					
Weight:		Approx. 14.0 kg					
Specifications subject to change without notice.							

© 1998 Matsushita Electric Industrial Co., Ltd. All rights reserved.

Unauthorized copying and distribution is a violation of law.

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

WARNING

* This product should be serviced only by trained, qualified personnel.
This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country identifications shown below for your applicable product specification.

HNE·····For Hong Kong
TNE·····For Thailand, Indonesia
MNQ·····For Malaysia
YNQ·····For Singapore
LNK·····For Philippines
KNQ·····For Kuwait, Doha, Qatar, Oman, Bahrain, Pakistan
SNM·····For Saudi Arabia
XNE·····For China
WNT·····For Taiwan

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

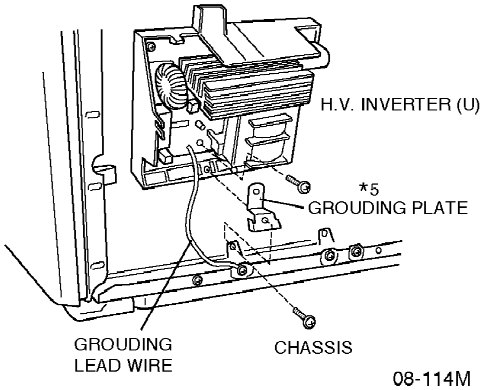
INVERTER WARNING

NEW H.V.

DANGER HIGH VOLTAGE

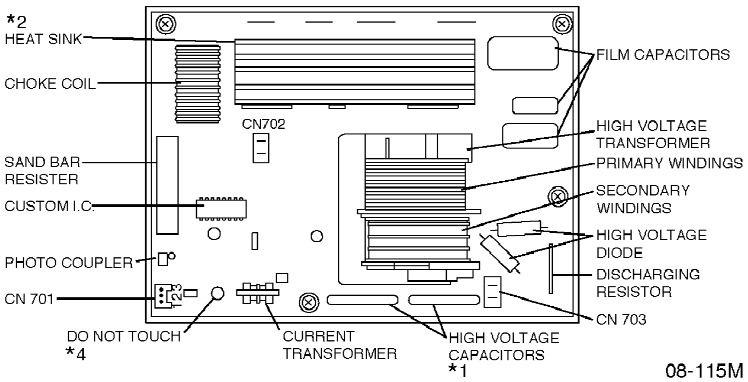
This Inverter board looks like a regular PCB; However, this PCB drives the magnetron tube with extremely high voltage and high current.
IT HAS: 1. Very high voltage and high current circuit.
2. Aluminum heat sink is very hot in high voltages and heat energy.
3. Very high voltage may remain in circuitry even when oven is off. High voltages may remain in the capacitors on the board.

DO NOT: ✻1. Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage may remain in circuit.
✻2. Do not touch aluminum heat sink because it is very hot in high voltage and also very hot in high heat energy.
✻3. Do not try to repair Inverter PCB because it is very dangerous to repair it. Replace as whole High Voltage Inverter Circuit (U) unit and return fully re-packed with original shipping box and shipping materials.
✻4. Do not try to adjust or tamper preset volume on the Inverter board because it is very dangerous to adjust without proper test equipment.
✻5. Do not test oven while Inverter grounding strip or screws are loose. It is very dangerous to operate the H.V.Inverter Circuit (U) with loose mounting screws or if imporperly grounded.



08-114M

INVERTER POWER SUPPLY DIAGRAM



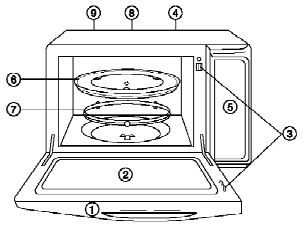
08-115M

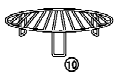
DO NOT REPAIR. REPLACE WHOLE H.V.INVERTER (U)

National®

1. CONTROL PANEL

Feature Diagram

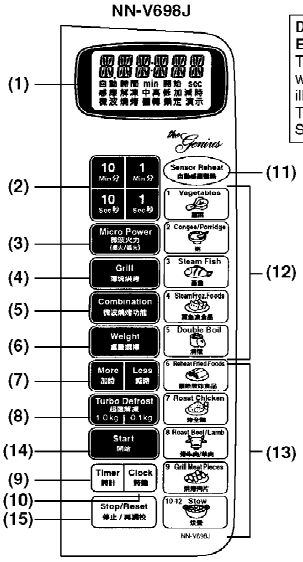




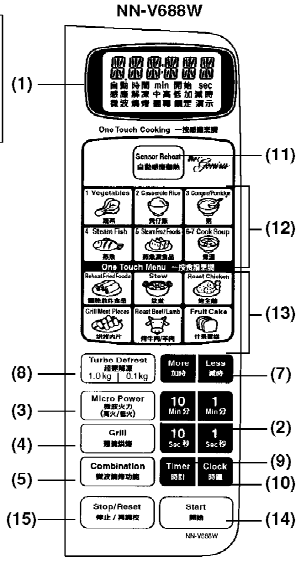
①Pull Door Handle
②Oven Window
③Door Safety Lock System
④Oven Air Vent
⑤Control Panel
⑥Glass Tray
⑦Roller Ring
⑧Identification Plate (model number)
⑨External Oven Air Vents
⑩Wire Rack

Control Panel

NN-V698J



NN-V688W



Display Window:
Energy Saving Light
The light in the display window will no longer be illuminated after 10 seconds. To illuminate press Start or Stop/Reset Pad once.

(1) Display Window
(2) Time Pads
(3) Microwave Power Pad
(4) Grill Pad
(5) Combination Pad
(6) Weight Pads
(7) More/Less Pads
(8) Turbo Defrost Pad
(9) Timer Pad
(10) Clock Pad
(11) Sensor Reheat Pad
(12) Sensor Cook Pads
(13) One Touch Menu Pads

Pull Door Handle:
Pull to open the door. Opening the door during cooking will stop the cooking process without cancelling the program. Cooking resumes as soon as the door is closed and Start Pad is pressed. The oven light will turn on and stay on whenever the door is opend. It is quite Safe to open the door at any time during a cooking program and there is no risk of microwave exposure.

Beep Sound:
When a pad is pressed correctly, a beep will be heard. If a pad is pressed and no beep is heard, the unit has not accepted the instruction. The oven will beep twice between programmed stages. At the end of any complete program, the oven will beep five times.

(14) Start Pad:
One tap allows oven to opened or functioning. If door is opened or Stop/Reset Pad is tapped once during oven operation, Start Pad must again be pressed to restart oven.

(15) Stop/Reset Pad:
Befor cooking: One tap clears your instructions.
During cooking: One tap temporarily stops the cooking process. Another tap cancels all your instructions and time of day will appear in the display.

2. OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

To turn off:

Timer → OPERATION GUIDE OFF

Press 3 times

To turn off:

Timer → OPERATION GUIDE ON

Press 3 times

1. To Set Clock

OPERATION	SCROLL DISPLAY
1. Plug the power supply cord into wall outlet.	*WELCOM TO WORD PROMPTING*
2. Press **Clock** pad.	*––SET TIME*
3. Enter tim of day (TOD) by pressing appropriate **Time** pads.	*11:25* *––PRESS CLOCK*
4. Press **Clock** pad. TOD has now been resistered into the digital programmer circuit and will count up by minutes.	*11:25*

2. Time Cooking for Two Stage

OPERATION	SCROLL DISPLAY
1. Place a water load in the oven.	
2. Press **Micro Power** pad once to set High power. (1st stage)	*HIGH* *––SET TIME*
3. Set for 5 seconds by pressing **1 sec** pad 5 times.	5 SEC *––PRESS START* *HIGH*
4. Press **Micro Power** pad 4 times to set Medium power. (2nd stage)	*MEDIUM* *––SET TIME*
5. Set for 1 minute by pressing **1 Min** pad once.	1 00 MIN SEC *––PRESS START* *MEDIUM*
6. Press **Start** pad.	5 SEC
7. When 1st stage cooking time has elapsed, oven automatically switches to 2nd stage cooking.	1 00 MIN SEC
8. When 2nd stage cooking time has elapsed, oven beeps 5 times and shuts off.	*ENJOY YOUR MEAL*

3. Turbo Defrost

OPERATION	SCROLL DISPLAY
1. Set the weight for 1 kg by pressing [1.0kg] pad.	1.0kg --PRESS START
2. Press [Start] pad.	11 00 MIN SEC
3. Press [Stop/Reset] pad twice. Oven shuts off. Time of day or colon appears in the display.	

4. One Touch Cooking

OPERATION	SCROLL DISPLAY
1. Press [STEW] pad .	--PRESS START
2. Press [Start] pad.	15 00 MIN SEC
3. When cooking time has elapsed. Oven beeps 5 times and shuts off.	ENJOY YOUR MEAL

5. To set Child Safety Lock

OPERATION	SCROLL DISPLAY
1. Press [Start] pad 3 times continuously. "LOCK" appears in the display.	*LOCK

6. To Reset Child Lock

OPERATION	SCROLL DISPLAY
1. Press [Stop/Reset] pad 3 times continuously. Time of day or colon appears in the display.	11:25

7. Demonstration Mode

The demonstration mode designed for retail store display. It is not designed for home use. Cooking will not operate during demonstration mode.
To set demonstration mode

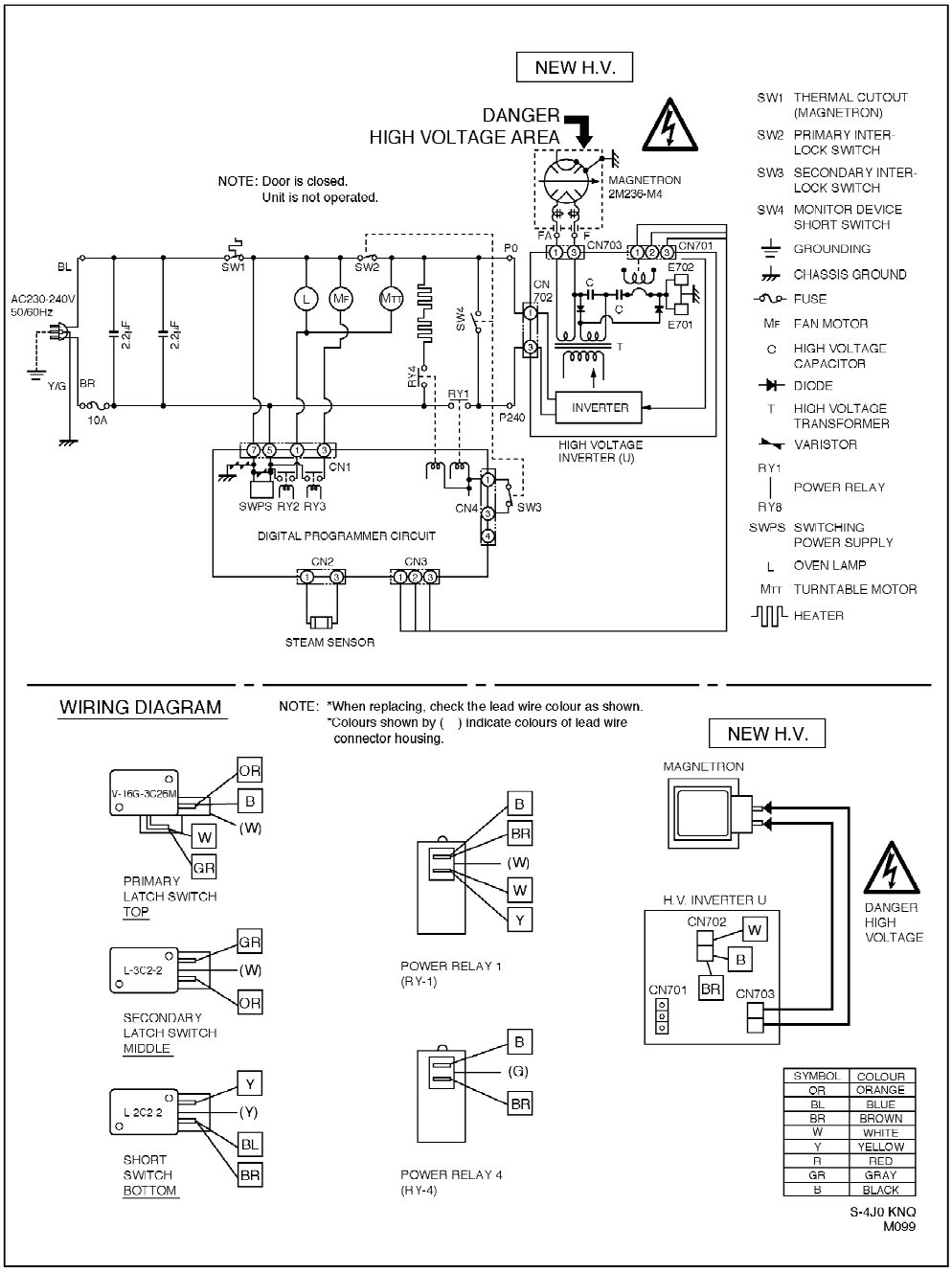
OPERATION	SCROLL DISPLAY
1. Press Clock pad 3 times continuously. Note: To cancel demonstration mode, press Clock pad 3 times continuously.	WORD PROMPTING DEMO MODE --PRESS ANY KEY

8. Sensor Cooking

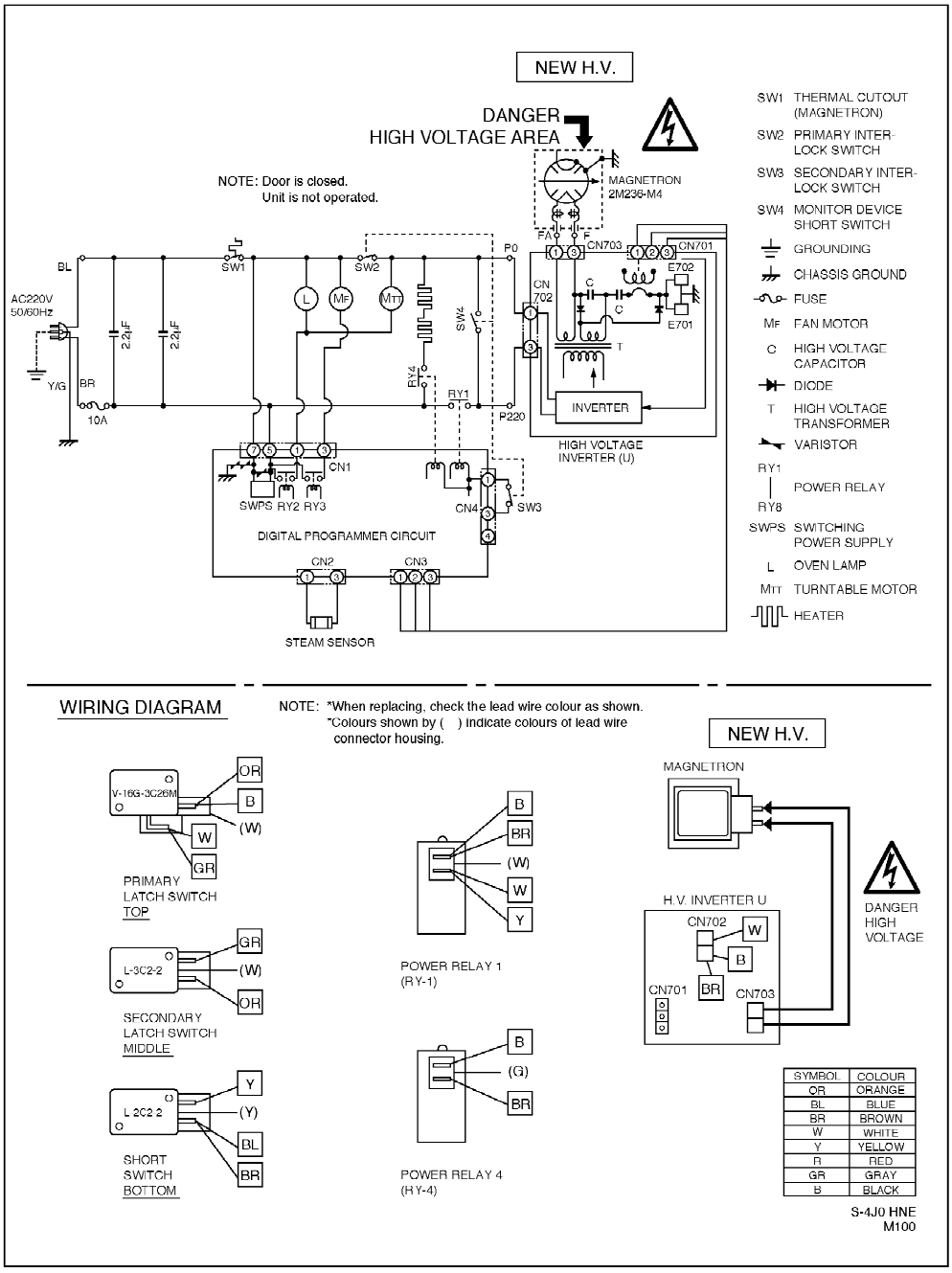
NOTE: Make sure that the outer panel is installed before Sensor Cooking Test, since Auto Sensor function does not operate properly without the outer panel.

OPERATION	SCROLL DISPLAY
1. Pour 150 ± 15cc (4.5 ±1/2 ozs) of room temperature water in a oven glassware or ceramic utensil, place the oven glassware or ceramic utensil in the center of the oven.	
2. Tap [Sensor Reheat] pad.	SENSOR REHEAT --PRESS START
3. Tap [Start] pad.	AUTO
4. The steam sensor detects steam about 1.5 to 4 minutes after the Start Pad is tapped. Sensor Brown Cooking (T1) automatically switshes to time cooking (T2). "AUTO" disappears with beep sounds and the remainder of cooking time appears in display window. **NOTE: Cooking time will vary depending on the water temperature, the shape of beaker or the power source voltage.**	MIN 6 SEC MIN 21 SEC
5. When the balance of cooking time has elapsed, oven stops and beeps five times.	ENJOY YOUR MEAL

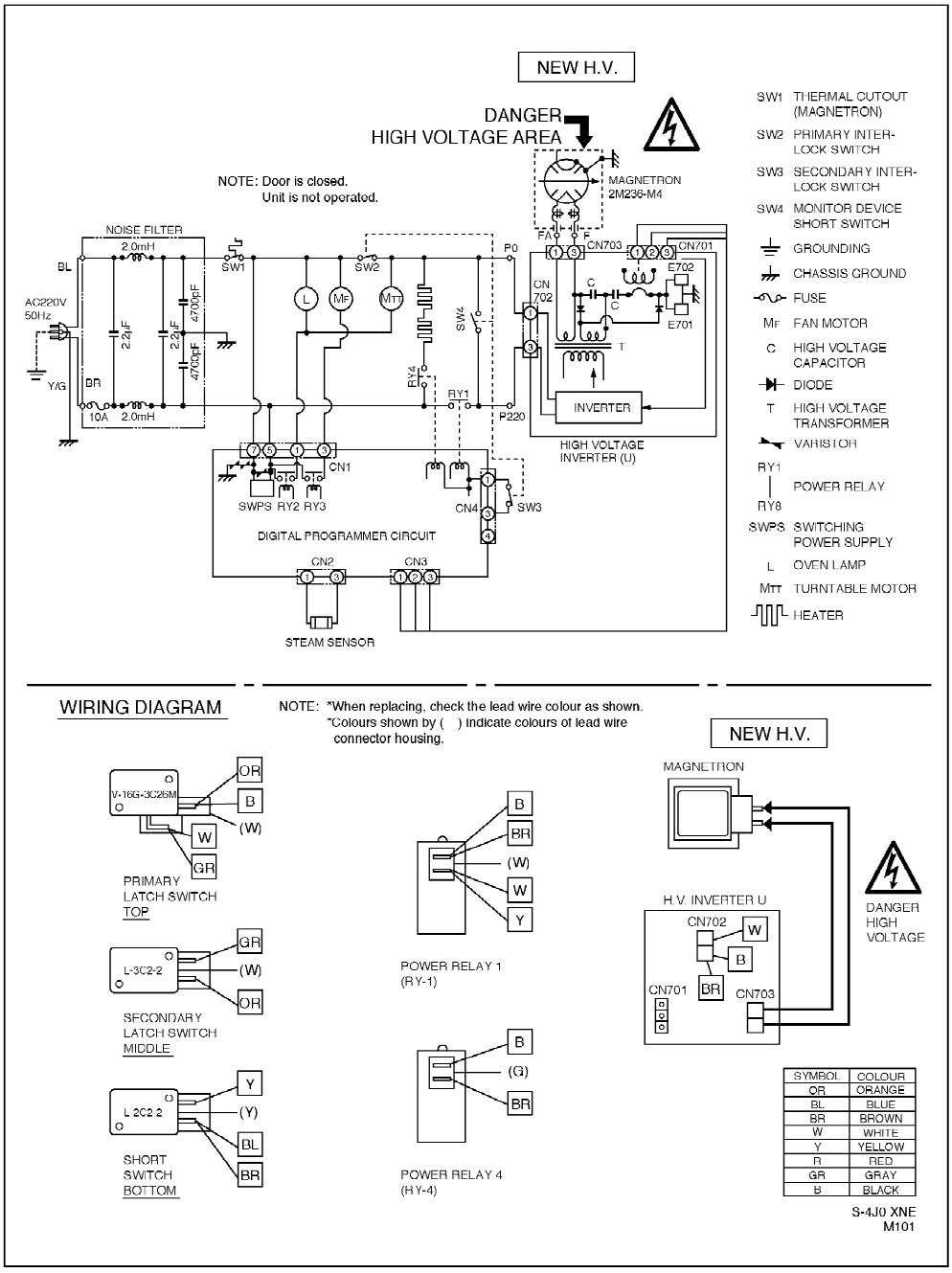
3. SCHEMATIC DIAGRAM (KNQ, MNQ, SNM, YNQ)



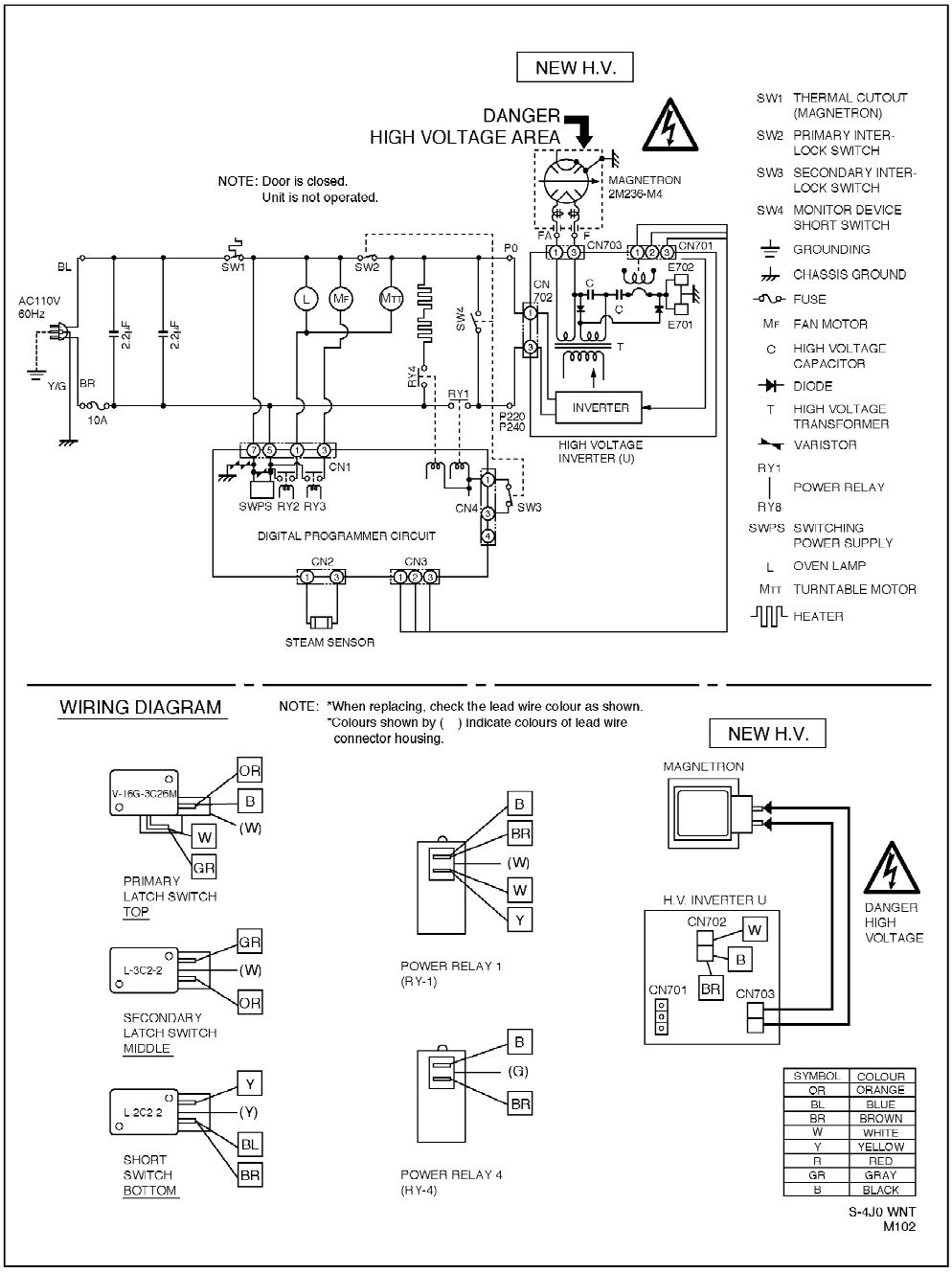
4. SCHEMATIC DIAGRAM (HNE, LNK, TNE)



5. SCHEMATIC DIAGRAM (XNE)



6. SCHEMATIC DIAGRAM (WNT)



7. DESCRIPTION OF OPERATING SEQUENCE

7.1. Variable power cooking control

HIGH VOLTAGE INVERTER POWER SUPPLY (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay 1 stays on but the inverter drive signal to control it's output power.

NOTE 1: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

NOTE 2: If microwave cooking is over 8 minutes with HIGH power, fan motor rotates for 1 minute after cooking to cool oven and electric components.

7.2. Grill cooking

The digital programmer circuit generates the power relay 4 control signal at ON time during grill cooking.

7.3. Combination cooking

Combination cooking is accomplished by microwave and grill cooking. The digital programmer circuit controls ON-OFF time of power relay 1 and 4 as shown in the table.
NOTE: After grill and combination cooking, fan motor rotates for 1 minute to cool oven and electric components.

7.4. Auto Defrost, One Touch Menu and Auto Reheat Control

When those auto control feature is selected and Start pad is pressed:

1. **The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display. The table shows the corresponding cooking times for respective weight by categories.**
2. **When cooking time in the display window has elapsed, the oven turns off automatically by the controlled signal from the digital programmer circuit.**

NOTE: After one touch menu and auto reheat cooking, fan motor rotates for 1 minute to cool oven and electric components.

POWER SETTING	OUTPUT POWER(%) APPROX.	RY-1	INVERTER CONTROL SIGNAL
HIGH	100 %	stay ON	stay ON
MEDIUM-HIGH	70 %	stay ON	stay ON
MEDIUM	55 %	stay ON	ON/OFF
MEDIUM-LOW	30 %	stay ON	ON/OFF
LOW	10 %	stay ON	ON/OFF
DEFROST	30 %	stay ON	ON/OFF

GRILL NO.	HEATER (RY-4)	
	ON (SEC)	OFF (SEC)
1	33	0
2	26	7

Combination No.	HEATER (RY 4)		Microwave (RY 1)	
	ON (SEC)	OFF (SEC)	ON (SEC)	OFF (SEC)
1	27	6	6	27
2	21	12	12	21
3	14	19	19	14

Turbo Defrost

WEIGHT SELECTED	COOKING TIME
1.0 kg	11 min. 00 sec.

One Touch Menu

CATEGORY	COOKING TIME
Vegetable Stew	10 min. 00 sec.
Meat Stew	8 min. 00 sec.

7.5. One touch cooking (Auto sensor cooking)

Auto sensor cooking is a revolutionary way to cook by microwave without setting a power level or selecting a time.

All that is necessary is to select an Auto Sensor Program before starting to cook.

Understanding Auto Sensor Cooking

As a food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In Auto Sensor Cooking, a carefully designed instrument, called the steam sensor element, senses this escape of steam. Then, based upon the Auto Sensor Program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE: Auto Sensor Cooking is successful with the foods and recipes found in the Auto Sensor Cooking Guide. Because of the vast differences in food composition, items not mentioned in the Cooking Guide should be prepared in the microwave oven using power select and time features. Please consult Variable Power Microwave Cookbook for procedures.

Explanation of the Auto Sensor Cooking process

1. During the first 10 second period there is no microwave activity, and when calculating the T2 time by using the formula below

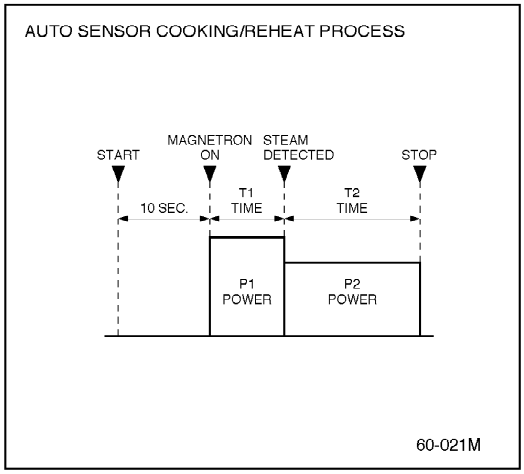
make sure this 10 seconds is subtracted from the T1 time. In other words T1 time starts at the end of the 10 second period.

2. T1 time The total amount of time it takes the microwave oven to switch to T2 time after the 10 second period.
3. T2 time When the steam escapes from the cooking container placed in the oven, the steam sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.

Balance of cooking time (T2 time)
The balance of cooking time which is called T2 time, can be calculated by the following formula.
T2 time (in sec.) = T1 time X K factor
NOTE: Remember, the T1 time starts after the 10 second period. The coefficient K is programmed Into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powers.
NOTE: When "More" or "Less" pad is selected, the K factor varies resulting in T2 time to be increased or decreased.
Example of calculating the T2 time
Example 1: If the T1 time is measured to be 2 minutes and 40 seconds after the 10 second period, and the Auto program selected is Vegetables:
T2 = T1 X K
= 2 min. and 40 sec. X 0.1
= 160sec. X 0.1
= 16 sec.

7.6. Auto Sensor Reheat

Auto Sensor Reheat is a quick and easy way to reheat refrigerator and room temperature foods. Simply press the reheat pad. There is no need to select power level and cooking time.
NOTE: The Auto Sensor Reheat process is same as Auto Sensor Cooking process.



One Touch Cooking (Auto Sensor Cook)

Category	P1 Power	P2 Power	K factor Standard
Vegetables	HIGH	LOW	0.1

Sensor Reheat

Category	P1 Power	P2 Power	K factor Standard
Sensor Reheat	HIGH	M. HIGH	0.1

8. CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION
Servicemen should remove their watches whenever working close to or replacing the magnetron.

8.1. Check the grounding

Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

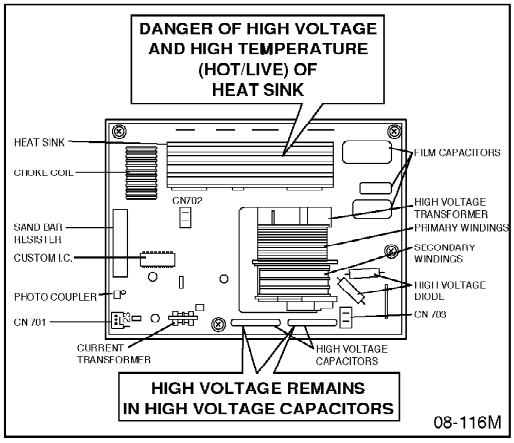
8.2. Inverter Warnings (NEW H.V.)

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

This High Voltage Inverter Power Supply circuit handles very high voltage and very high current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair. As you can see, it looks like a TV flyback transformer, however the current is extremely large and so danger exists by its high current and high voltages.

The aluminum heat sink is also energized with high voltage (HOT), so do not touch when AC input terminal is connected to the power line because one of the IGBT switching power devices (Collector) is directly connected to the Aluminum heat sink.

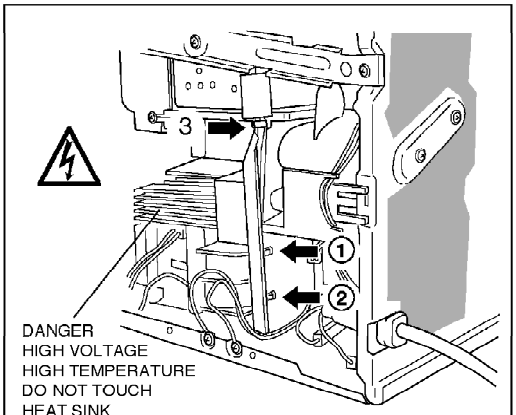
The Aluminum heat sink may be HOT by heat energy; therefore, extreme care should be taken during servicing and replacing.



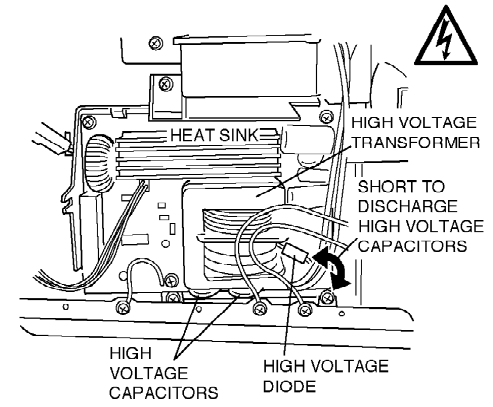
WARNING OF DISCHARGING HIGH VOLTAGE CAPACITORS

Warning about the electric charge in the high voltage capacitors. For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the inverter power supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and remove air guide cover then short the Inverter high voltage diode terminal to the chassis ground with an insulated handle screwdriver to discharge. Please make sure to touch chassis ground side first then short to the output terminals.



08-118M



Touch chassis side first then short to the high voltage diode terminal.

08-119M

WARNING

There is high-voltage present, with high-current capabilities in the circuits of the primary, and secondary windings, choke coil and heat sink of the Inverter. It is extremely dangerous to work on or near these circuits with oven energized.

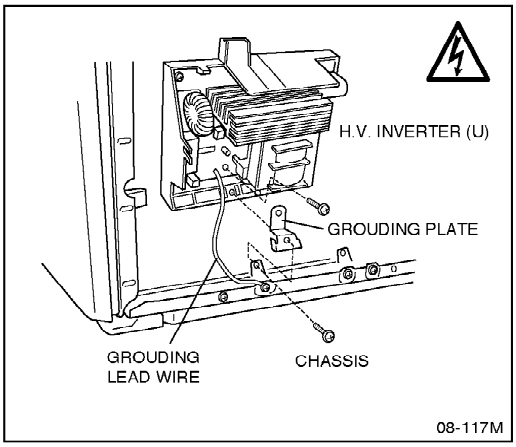
DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

WARNING OF INVERTER POWER SUPPLY (U) GROUNDING

Check the High Voltage Inverter Power Supply circuit grounding. This High Voltage Inverter Power Supply circuit board must have a proper chassis ground by the grounding bracket to the chassis ground; otherwise, this H.V.Inverter circuit board will expose very high voltage and cause extreme DANGER! Be sure to have proper grounding by the grounding plate and screws.



8.3. When parts must be replaced, remove the power plug from the outlet.

8.4. When the 10A 250V fuse is blown due to the operation of short switch:

WARNING

When the 10A 250V. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay 1 (RY1) when the continuity check reads shorted contacts (1-2).

1. **This is mandatory. Refer to "Adjustments and Measurement" for these switches.**
2. **When replacing the fuse, confirm that it has the appropriate rating for these models.**
3. **When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.**

8.5. Avoid inserting nails, wire, etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes gaps, because such objects may work as an antenna and cause microwave leakage.

8.6. Confirm after repair

1. **After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwaves might leak if screws are not properly tightened.**
2. **Make sure that all electrical connections are tight before inserting the plug into the wall outlet.**

CAUTION
MICROWAVE RADIATION
DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE
1. The following components have potentials above 250V while the appliance is operated.
   * Magnetron
   * Heat sink of H.V.INVERTER (U)
   * High voltage transformer (H.V.INVERTER (U))
   * High voltage diode (H.V.INVERTER (U))
   * High voltage capacitors (H.V.INVERTER (U))

   Pay special attention on these portions.
2. When the appliance is operated with the door hinge or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/cm^2. After repair or exchange, it is very important to check if magnetron and the door hinge is correctly fixed.

9. DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

9.1. Magnetron

1. **Discharge the high voltage capacitor.**
2. **Remove 2 screws of bracket.**
3. **Remove 3 screws of air guide.**
4. **Disconnect 2 high voltage lead wires from magnetron filament terminals.**
5. **Remove a screw holding thermal cutout.**
6. **Remove 2 screws holding thermal cutout bracket.**
7. **Remove 4 screws holding magnetron.**

NOTE: After replacement of the magnetron, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

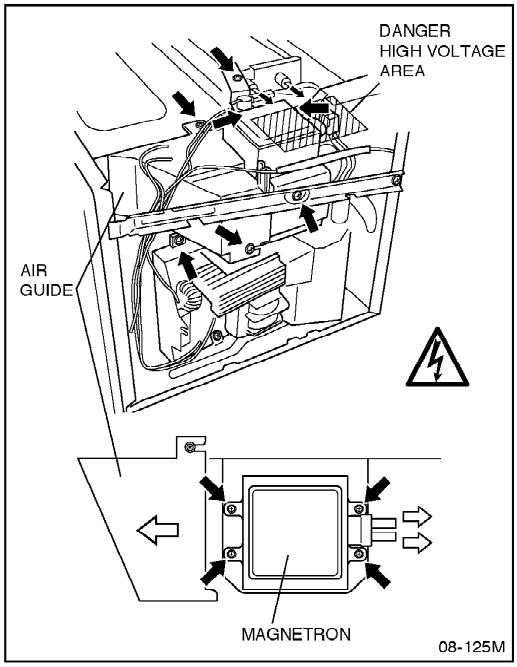
CAUTION
When replacing the magnetron, be sure the antenna gasket is in place.

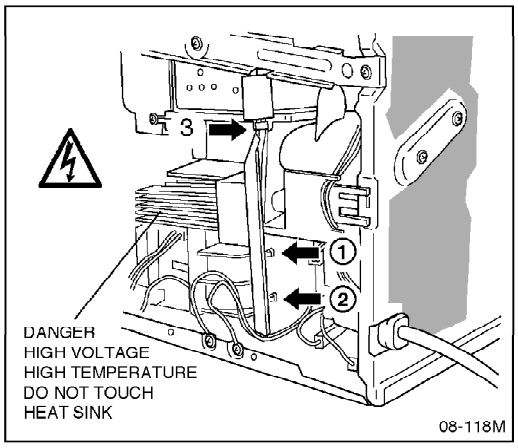
NOTE
Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

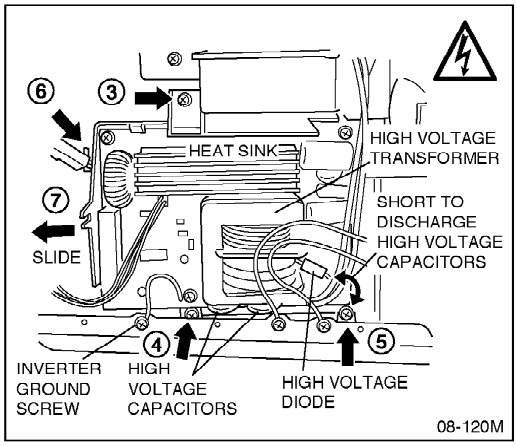
NOTE: Magnetron used for this modes is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

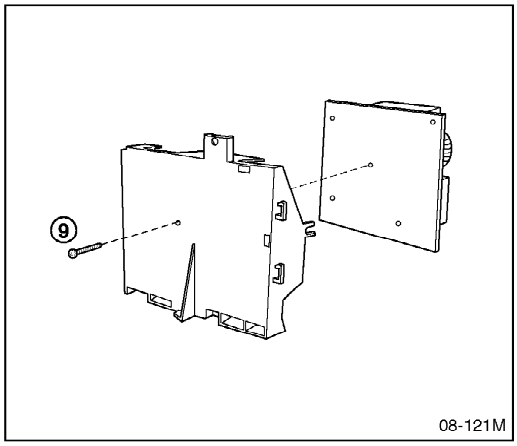
9.2. High Voltage Inverter Power Supply (U) (NEW H.V.)

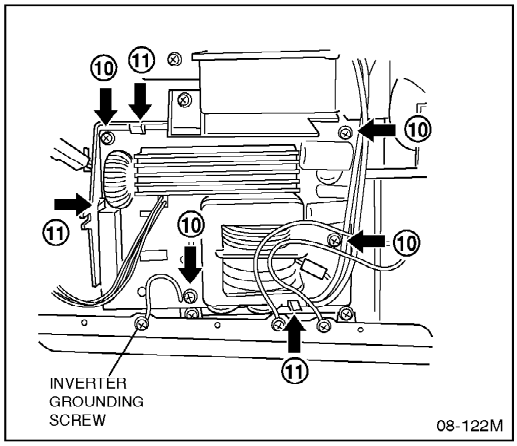
1. Release 2 clips of air guide 1, 2.
2. Release wire holder holding high voltage leads 3.
3. Discharge high voltage.
4. Remove a screw holding grounding/earthing lead wire to chassis.
5. Remove screws 3, 4 and 5.
6. Remove turntable motor lead wires from its hook 6.
7. Slide inverter (U) to left to release it from chassis.
8. Unplug CN701, CN702 and CN703 connectors.
   NOTE: Do not pull by lead wires but make sure to pull housing case unless PCB or lead wire may break.
9. Remove a screw 9 holding high voltage transformer to its bracket from back.
10. Remove 4 screws 10 holding H. V. Inverter (U).
11. Release 3 tabs 11 to remove H. V. Inverter (U).
12. Make sure to place grounding plate 12 in its place when replacing H. V. Inverter (U).
13. When installing H. V. Inverter (U), make sure to insert 2 tabs on rear side. First place H. V. Inverter (U) approx. 2 cm left side and then slide right to correct position to secure grounding screws.
14. Tighten 3 screws to secure H. V. Inverter (U) with bracket.
15. Tighten a screw to secure grounding lead wire.
16. Connect CN701, CN702 and CN703 lead wires.

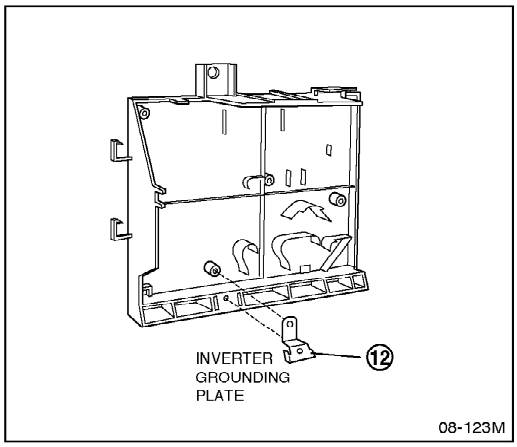

DANGER
HIGH VOLTAGE
AREA
AIR
GUIDE
MAGNETRON
08-125M

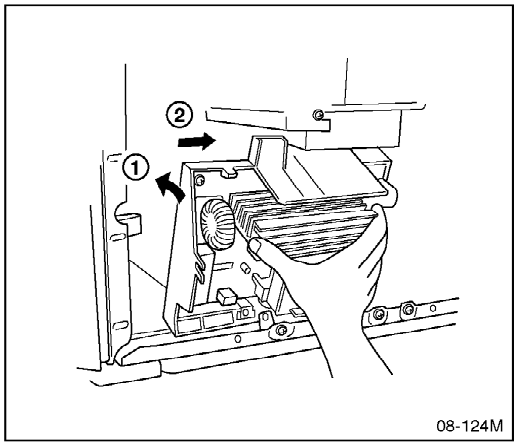

3
1
2
DANGER
HIGH VOLTAGE
HIGH TEMPERATURE
DO NOT TOUCH
HEAT SINK
08-118M


6
3
HEAT SINK
HIGH VOLTAGE
TRANSFORMER
7
SLIDE
SHORT TO
DISCHARGE
HIGH VOLTAGE
CAPACITORS
4
5
INVERTER
GROUND
SCREW
HIGH
VOLTAGE
CAPACITORS
HIGH VOLTAGE
DIODE
08-120M


⑨
08-121M


⑩
⑪
⑩
⑪
⑩
⑩
⑪
INVERTER
GROUNDING
SCREW
08-122M

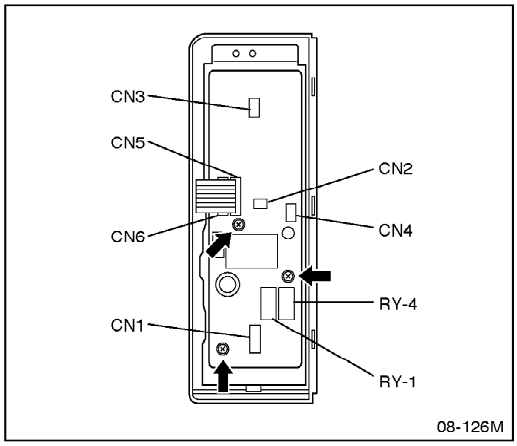

⑫
INVERTER
GROUNDING
PLATE
08-123M



9.3. Digital programmer circuit (DPC) and membrane key board.

NOTE: Be sure to ground any static electric charge built up on your body, before handling the DPC.

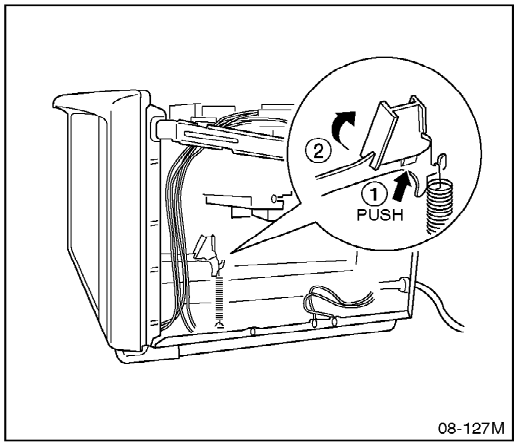
1. **Disconnect all connectors from D.P.C.**
2. **Remove 2 screws holding escutcheon base and slide the escutcheon base upward slightly.**
3. **Release CN5 and CN6 connector's lock of DPC by pushing both levers to inside and pull them upward, and remove flat cable of membrane key board.**
4. **Remove 3 screws holding DPC.**
   To replace membrane key board
5. **Remove escutcheon bracket from escutcheon base by freeing 4 catch hooks on the escutcheon base.**
6. **On some models, the key board is not replaced with individual parts. Instead, the entire escutcheon base assembly must be replaced. Refer to parts list.**

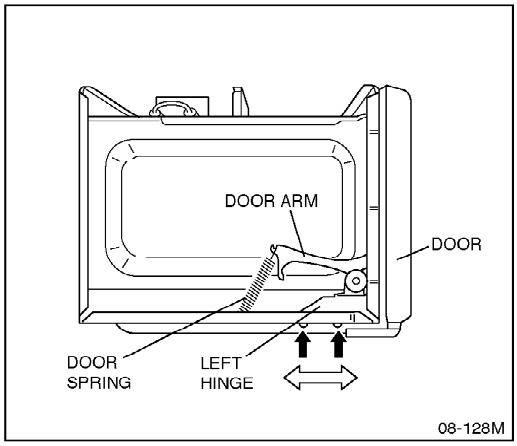


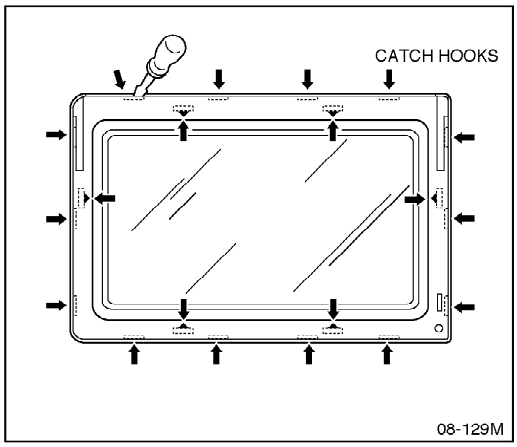
9.4. Door assembly

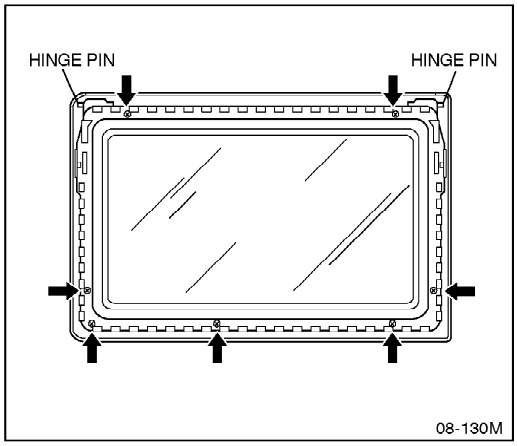
1. Remove H. V. Inverter (U) refer to previous column 2.
2. Remove door spring right side.
   NOTE: Please hold door unless door become fall down.
3. Remove door arm lever by pushing tab and turn clock wise.
4. Remove door spring left.
5. Loose 2 screws holding left hinge.
6. Slide out left hinge to release hinge pin of the door.
7. Slide out door arms from the oven to disconnect door assembly.
8. Remove door arms from the door assembly.
   To remove door C
9. Release catch hooks from hinge pin side.
   To remove door E
10. Remove screws holding door E to door A assembly.
    After replacement of the defective component parts of the door, reassemble it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage. Adjustment of the door assembly.
11. When mounting the door to the oven, be sure to adjust the door parallel to the oven face plate by moving hinges back or front.

NOTE: Upper portion of door A should farmly touch to oven face plate without pushing.


②
①
PUSH
08-127M


DOOR ARM
DOOR
DOOR
SPRING
LEFT
HINGE
08-128M


CATCH HOOKS
08-129M



9.5. Turntable motor

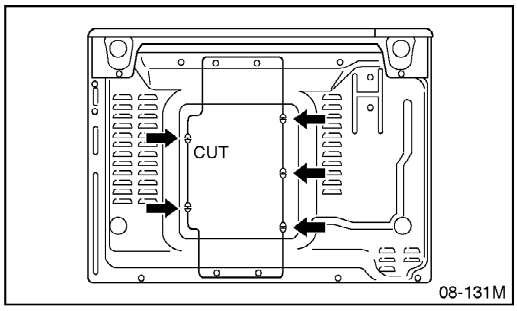
1. Breaking off at 5 spots indicated by allow with a cutter or like.

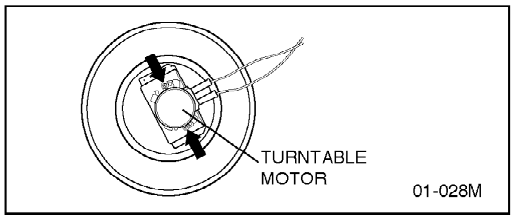
2. Remove 2 screws holding motor cover.

3. Disconnect 2 lead wires from turntable motor.

4. Remove 2 screws holding turntable motor.

NOTE: Make sure to remove sharp barrs at 5 spots to avoid possible injury.



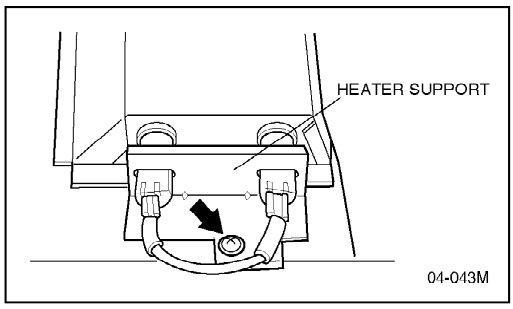


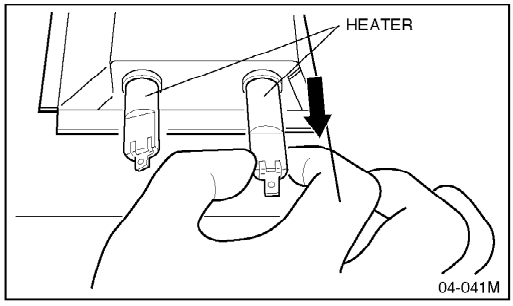
9.6. Quartz heater

1. Disconnect lead wires from heater terminals.

2. Remove 1 screw holding heater supports.

3. Remove the heater by pulling it out.





10. COMPONENT TEST PROCEDURE

DANGER NEW H.V.

1. High voltage is present at the high voltage terminal of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

10.1. Primary Latch Switch, Secondary (Secondary Latch Switch and Power Relay 1) Interlocks.

1. **Unplug the lead connectors to Power Relay 1 and verify continuity of the power relay 1 1-2 terminals.**
2. **Unplug lead connectors to Primary Latch Switch and Secondary Latch Switch.**
3. **Test the continuity of switches at door opened and closed positions with ohm meter (low scale).**
   Normal continuity readings should be as follows.

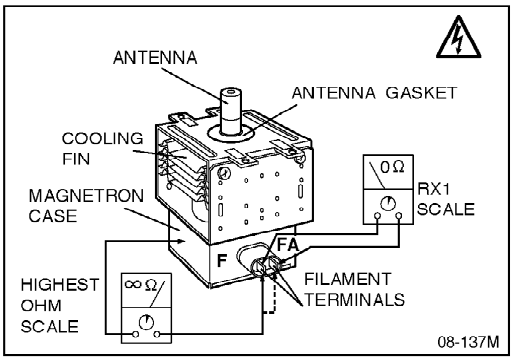
	Door Opened	Door Closed
Primary Latch Switch	∞ Ω (open)	0 Ω (close)
Secondary Latch Switch	∞ Ω (open)	0 Ω (close)
Power Relay 1	∞ Ω (open)	∞ Ω (open)

10.2. Short Switch / Monitor Circuit

1. **Unplug lead wires from H. V. Inverter primary terminals.**

2. Connect test probes of ohm meter to the disconnected leads which were connected to H. V. Inverter.
3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.
   Normal continuity readings should be as follows.

Door Opened	Door Closed
0 Ω	∞ Ω



10.3. Magnetron (NEW H.V.)

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

1. Isolate magnetron from the circuit by disconnecting the leads.
2. A continuity check across magnetron filament terminals should indicate one ohm or less.
3. A continuity check between each filament terminal and magnetron case should read open.

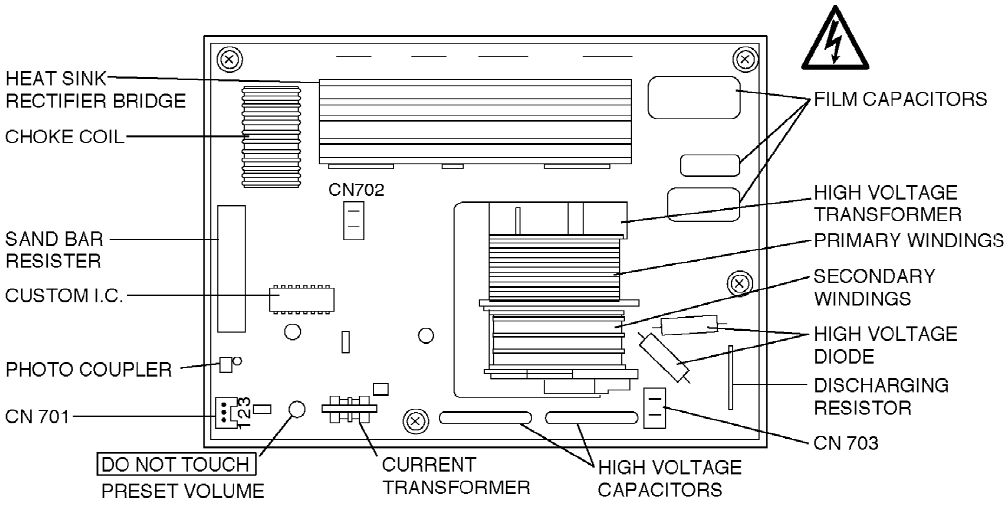
NOTE
Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

10.4. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

10.5. Inverter Power Supply (U) (NEW H.V.)

DO NOT try to REPAIR this H. V. Inverter power supply (U).
Replace as whole H. V. Inverter (U) Unit.
Refer to warning on page 2.



10.6. Inverter Power Supply (U) (NEW H,V,)

DANGER HIGH VOLTAGE

Test if failufe codes of H97 or H98 appears by doing the following procedure. It is recommended to used an AC line input current Ampare meter for testing.

Test 1

1. **Place 1 liter of water load into oven cavity.**
2. **Unplug 2 pin H. V. lead wire connector CN703 from magnetron tube.**
3. **Program oven at High power for 1 minute and press start.**
   - **A. After approx. 15 seconds, oven displays H98 and stops oven.**
   - **B. During oven operation, input current is approx. at 0.5 to 1.0A (1.0 to 1.7A for 110V mode). If input current is OK, please proceed to test 2.**

	INPUT AMPARE	FAILURE CODE
Unplug CN703	0.5 to 1A for 220/230/240V model 1.0 to 1.7A for 110V model	H98

Test 2

Continued from Test 1

1. **Unplug 3 pin connector, CN701 CN703 remaisn unplug.**
2. **Set oven at High power for 1 minute and start.**
   - **A. After approx. 25 seconds, oven displays H97 and stops oven.**
   - **B. During oven operation, input current should be less than 0.4A(0.4 to 0.8A for 110V model).**

	INPUT AMPARE	FAILURE CODE
Unplug CN701	less than 0.4A for 220/230/240V model less than 0.4 to 0.8A for 110V model	H97

If both 1 and 2 are OK, the Inverter Power Supply (U) can be determined OK.

10.7. Steam Sensor and Digital Programmer Circuit

In order to determine if the steam sensor function of the digital programmer circuit is in working order or not, do the following test.

1. **Place a water load (150 cc) in the oven.**
2. **Tap Sensor Reheat pad.**
3. **Tap Start Pad.**
4. **Steam Sensor detects steam about 1.5 to 4 minutes after the Start Pad is tapped.**
5. **T1 time cooking automatically switches to remaining time cooking (T2).**
6. **The remaining cooking time (T2) appears in display window. If the following cooking time appears, Steam Sensor function is normal.**

T1 TIME	T2 TIME (Remaining cooking time)
1 Min. 30 Sec. ~ 4 Min.	6 Sec. ~ 21 Sec.

11. MEASUREMENTS AND ADJUSTMENTS

11.1. Adjustment of Primary latch switch, Secondary latch switch and short switch

1. **When mounting Primary latch switch, Secondary latch switch and short switch to door hook assembly, mount the Primary latch switch, the Secondary latch switch and the short switch to the door hook assembly as shown in table.**
   NOTE: No specific adjustment during installation of Primary latch switch, Secondary latch switch and short switch to the door hook is necessary.
2. **When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook**

assembly to the oven assembly.

3. Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

11.2. Measurement of microwave output

The output power of magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

***1 liter beaker**

***Glass thermometer**

***Wrist watch or stopwatch**

NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker's temperature (recorded as T1)
2. Place the beaker on the center of glass cook plate. Set the oven for High power and heat it for exactly one minute.
3. When one minute is elapsed, open the door and take out beaker.
4. Stir the water again and read the temperature of the beaker (recorded as T2).
5. The normal temperature rise at High power position for each models is as shown in table.

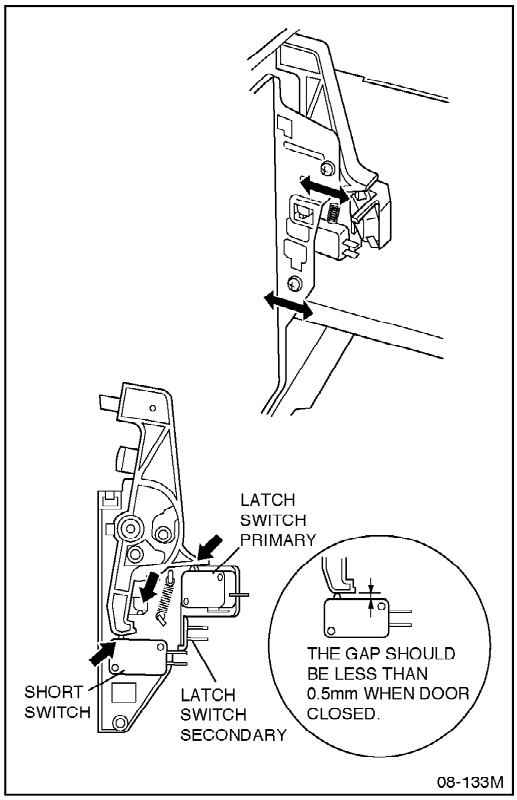


TABLE (1ℓ-1 min. test)

OUTPUT	TEMPERATURE RISE
900W	Min. 8.0°C
1000W	Min. 8.6°C

12. TROUBLESHOOTING GUIDE (NEW H.V.)

DANGER

1. **DO NOT try to REPAIR this H.V.Inverter power supply (U). Replace as whole H.V.Inverter (U) Unit.**
2. **DO NOT RE-ADJUST PRESET VOLUME on the H.V.Inverter (U).** It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very large current with very high voltage. Off alignment of inverter board operation will be dangerous.
3. Ensure proper grounding before checking for trouble.
4. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
5. Discharge high voltage remains in the H. V. Inverter (U).
6. When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot be removed.
7. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel. Always touch yourself to ground while working on this panel to discharge any static charge in your body.
8. 110/220/230/240V AC is present on the digital programmer circuit (Terminals of power relay's and primary circuit of Digital Programmer Circuit. When troubleshooting, be cautious of possible electrical shock hazard.

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

(Trouble 1)

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness 2. Open thermal cutout (Magnetron) 3. Defective DPC	Check fan motor when thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch switch (NOTE 1) 3. Defective short switch (NOTE 1) NEW H.V. 4. Defective H.V.Inverter power supply (U) Refer to component test procedure	Check adjustment of primary, secondary latch switch and short switch including door.
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions.) Check continuity of power relay 1's contacts (between 1 and 2) and if it has continuity, replace power relay 1 also.	
3.	Oven does not accept key input (Program).	1. Key input is not insequence 2. Open or loose connection of membrane key pad to DPC (Flat cable) 3. Shorted or open membrane key board 4. Defective DPC	Refer to operation procedure. Refer to DPC troubleshooting.
4.	Oven lamp and fan motor turn on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch	Adjust door and latch switches.
5.	Timer starts countdown but no microwave oscillation. (No heat while oven lamp and fan motor turn on) H97/H98 may appears	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component NEW H.V. H.V.Inverter (U) Magnetron 4. Open or loose wiring of power relay 1 5. Defective primary latch switch 6. Defective power relay 1 or DPC	Adjust door and latch switches. Check high voltage component according to component test procedure and replace if it is defective. Refer to DPC troubleshooting.

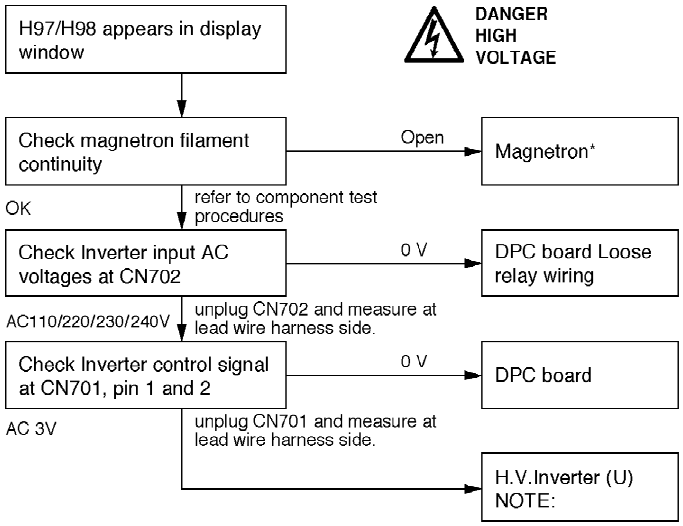
Fig. TROUBLESHOOTING GUIDE 1

	SYMPTOM	CAUSE	CORRECTIONS
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	Adjust door and latch switches.
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit (Intermittent oscillation) 3. Aging change of magnetron	Consult eletrician. Refer to output test procedures by water temperature raising test.
8.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
9.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
10.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout (Magnetron)	Adjust door and latch switches.
11.	Oven returns to plugged in mode after 10 seconds elapses on the Auto sensor cooking mode.	1. Open or loose wiring of sensor terminal from DPC 2. Open steam sensor 3. Defective DPC	

Fig. TROUBLESHOOTING GUIDE 2

Troubleshooting of H.V.Inverter Circuit (U) and Magnetron NEW H.V.

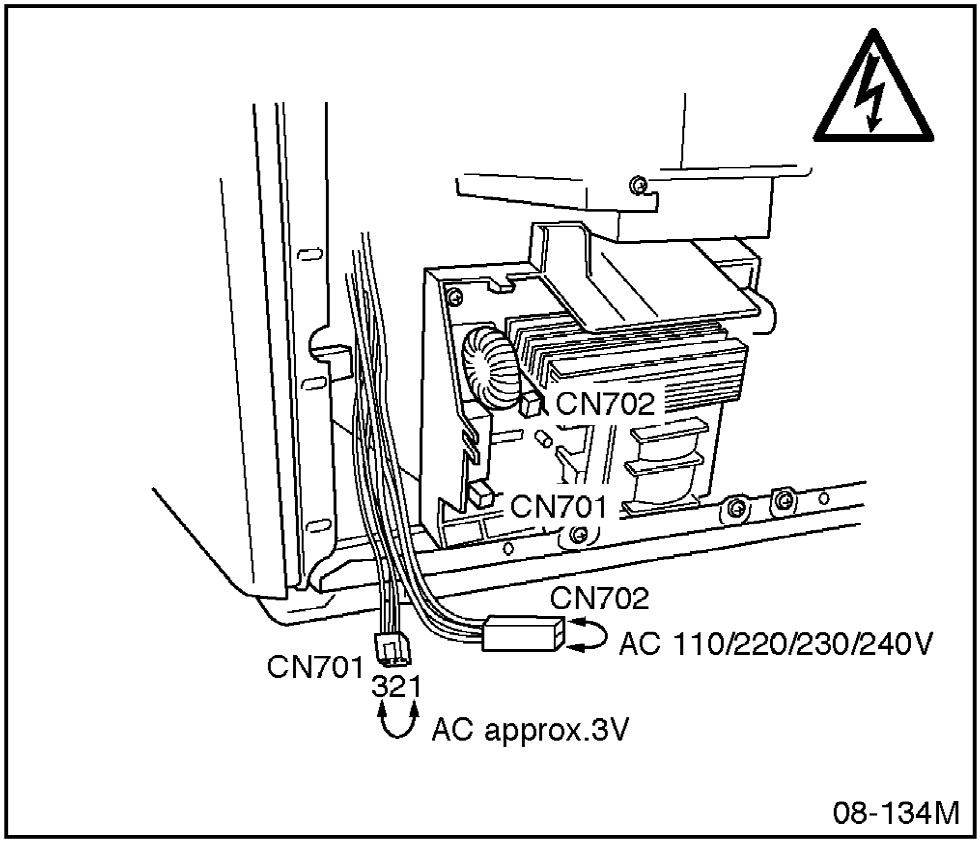
This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H97 and H98 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H97 and H98.
H97 or H98 appears in display window a short time after start key is pressed and there is no microwave oscillaiton.



NOTE: DO NOT try to REPAIR this H.V.Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

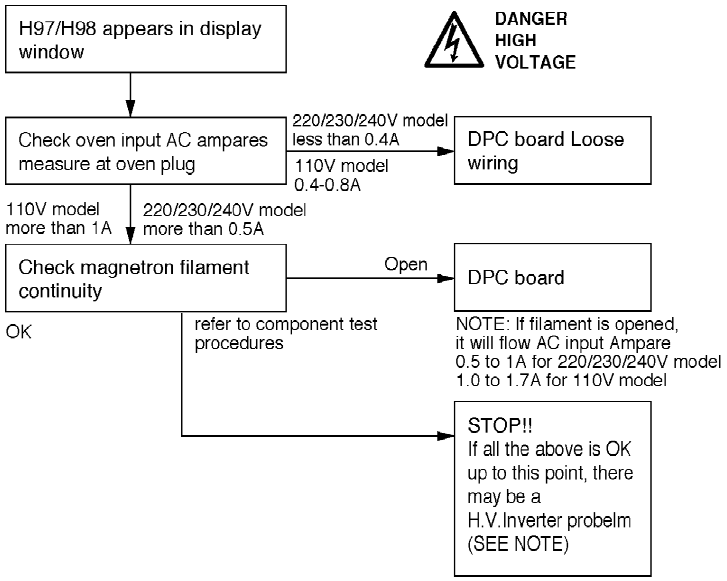
* Check magnetron filament for open or short to casing before proceeding to determine a good magnetron.

Fig. TROUBLESHOOTING GUIDE 3

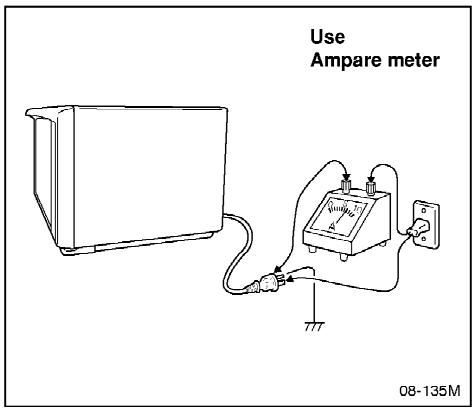


Alternative way to troubleshoot oven with AC Ampare meter used. NEW H.V.

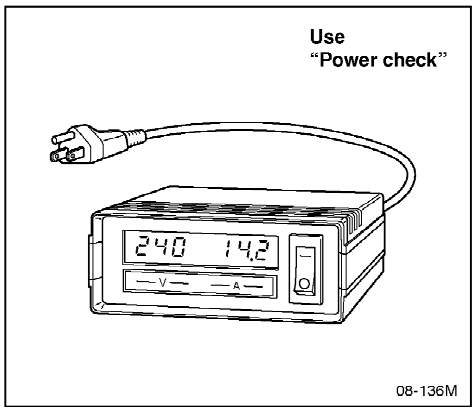
H97/H98 appears in display window a short time after start key is pressed and no microwave oscillation with AC Ampare meter used for troubleshooting.


H97/H98 appears in display window
DANGER
HIGH
VOLTAGE
Check oven input AC ampares measure at oven plug
220/230/240V model less than 0.4A
110V model 0.4-0.8A
DPC board Loose wiring
110V model more than 1A
220/230/240V model more than 0.5A
Check magnetron filament continuity
Open
DPC board
OK
refer to component test procedures
NOTE: If filament is opened, it will flow AC input Ampare 0.5 to 1A for 220/230/240V model 1.0 to 1.7A for 110V model
STOP!!
If all the above is OK up to this point, there may be a H.V.Inverter probelm (SEE NOTE)

NOTE: DO NOT try to REPAIR this H.V.Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very high voltage and very large current. Off alignment of Inverter board operation is dangerous. Operating a misaligned inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.



OR

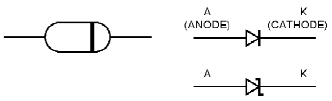


(Trouble 2) Trouble related Digital programmer circuit

STMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse resistor R13 1Ω	Normal	STEP 2
			Open	Shorted circuit of IC-12
	2	IC-1pin 3 voltage (Output terminal)	Abnormal	IC-1
			Normal ≒ 5V	→ IC-1, CX1, DISPLAY
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 8 voltage	Abnormal	IC-1
			Normal	BZ, Q310
Power relay A (RY-2) does not turn on even though the program has been set and the start pad is tapped	1	IC-1 pin 70 voltage while operation	Abnormal	IC-1
			Normal ≒ 5V	→ Step 2
	2	Short circuit between pin 6 and pin 16 of IC-220	Still not turn on	RY-2
			RY-2 turns on	IC-2
No microwave oscillation at any power setting	1	IC-1 pin 11 voltages while operation at high power	Abnormal	IC-1
			Normal 5··· ≒ 5V	→ Step 2
	2	Q220 transistor	Abnormal	Q220
			Normal	IC-220, RY-1
Dark or unclear display	1	Replace display and check operation	Normal	DISPLAY
			Abnormal	IC-1
Missing or lighting of unnecessary segment	1	Replace IC-1 and check operation	Normal	IC-1
			Abnormal	DISPLAY

13. HOW TO CHECK THE SEMICONDUCTORS USING AN OHM METER

Diode



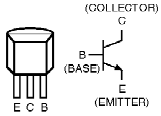
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC·····

2SD·····

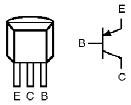


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

2SA·····

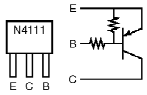
2SB·····



	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

Digital Transistor

PNP Transistor

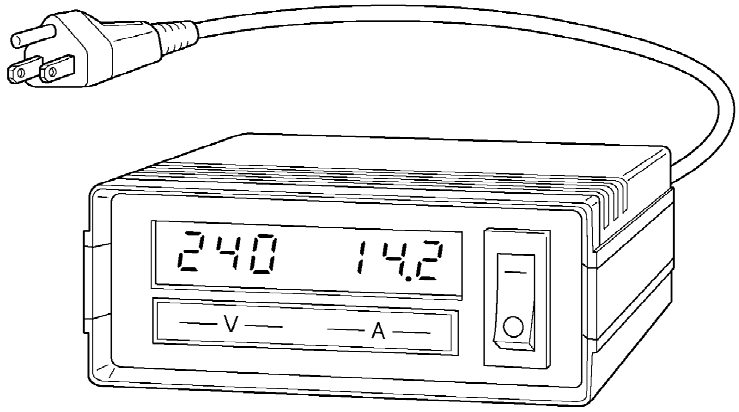


	FORWARD	REVERSE
E-B	10kΩ ~ 30kΩ	10kΩ ~ 30kΩ
C-B	50kΩ ~ 90kΩ	∞
C-E	40kΩ ~ 80kΩ	∞

14. INTRODUCING OF TEST JIGS

1. "Power Check" (Microwave Oven Tester)

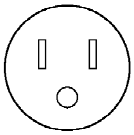
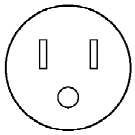
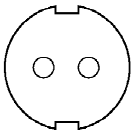
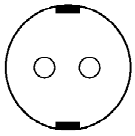
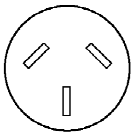
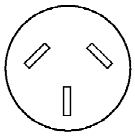
This tester can be measure both line voltage and ampares at a time for easy and quick testing microwave oven.



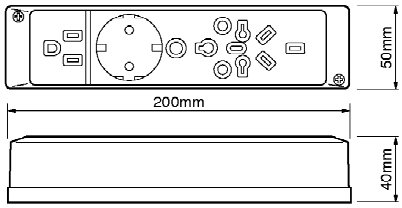
Specifications

Dimensions	133 mm (W) X 150 mm (D) X 57 mm (H)
Operating/ Measureing Voltage	100 -240 V 50/60 Hz
Measureing Ampares	0.1 -15.0 A (up to 20 A for short time operation)
Plug and Outlet type	See below
Specifications subject to change without notice.	

Part number/Plug and Outlet type

Part No.	Plug	Outlet
A600Z0000AP		
A600Z0000GP		
A600Z0000QP		

2. Universal outlet

Part No.	Available Outlet Type
WCF5901H	

3. Stainless steel ruler (150mm) Part No. A130005-150
It is convenient to use for adjustment of door. Also it is convenient to use for removing door C.
4. Flourescent light bulb (4W) Part No. A600Z-FL4W
This is convenient for check whether microwave is oscillate or not in a second.
WARNING: Use it with full one litter of water load and make sure less than 10 seconds oscillation on each time. Longer operation will cause over heat and burn the light bulb shortly.

15. EXPLODED VIEW AND PARTS LIST

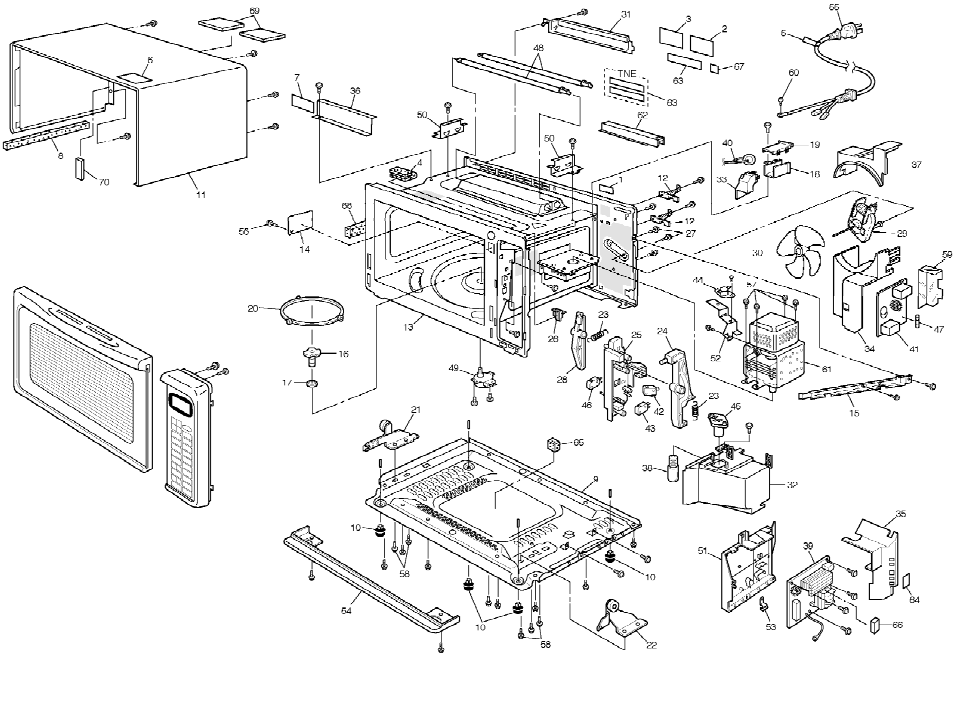


Fig. EXPLODED VIEW

16. PARTS LIST

When ordering replacement part(s), please use part number(s) shown in this parts list.
Do not use description of the part.
Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacture's specified parts.

Alphabet marks in Remarks colums (i.e. HNE etc.) indicate parts applicable to only specified country models as follows.
HNE: For Hong Kong, WNT: For Taiwan, XNE: For China,
KNQ: For Kuwait, Doha, Qatar, Oman, Baharain, Pakistan, LNK: For Philippines,
MNQ: For Malaysia, SNM: For Saudi Arabia,
TNE: For Thailand, Indonesia, YNQ: For Singapore
Parts without these marks can be used for all models.

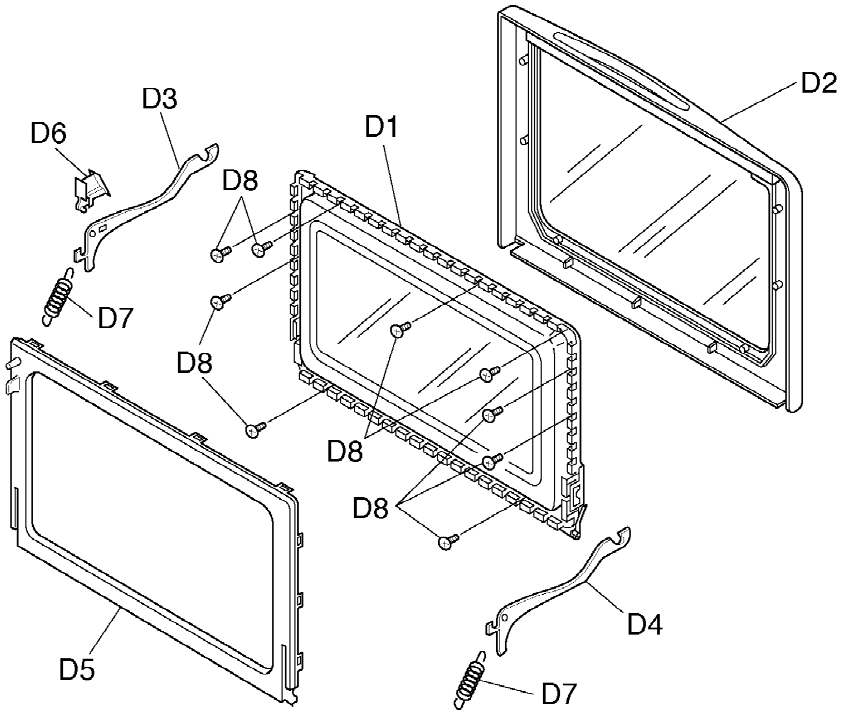
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
1	ANE00057J0XN	EARTH LABEL	1	NN-V688W TNE NN-V698J TNE/WNT
2	A00065460JP	CAUTION LABEL	1	NN-V668W KNQ/SNM NN-V688W NN-V698J HNE/KNQ/MNQ/SNM/TYNQ
2	A00063310WN	CAUTION LABEL	1	NN-V698J WNT
2	A00067680XN	CAUTION LABEL	1	NN-V668WS NN-V688WS NN-V698JS
3	A00065540MN	CAUTION LABEL	1	NN-V688W YNQ NN-V698J YNQ
4	ANE0921000AH	CUSHION RUBBER C	1	NN-V668W NN-V668WS NN-V688W HNE NN-V688WS NN-V698J NN-V698JS
5	ANE0239L00XN	CORD CAUTION LABEL	1	NN-V668W NN-V698J KNQ/SNM
6	A02448970KK	BODY CAUTION LABEL	1	NN-V668W
6	A02448980XN	BODY CAUTION LABEL	1	NN-V668WS NN-V688W NN-V688WS
6	A02444J00XN	BODY CAUTION LABEL	1	NN-V698J HNE/LNK/MNQ/TNE/YNQ/WNT NN-V698JS
6	A02444J00KK	BODY CAUTION LABEL	1	NN-V698J KNQ/SNM
7	A04906520BP	HEATER LABEL	1	NN-V668W KNQ NN-V688W MNQ/YNQ NN-V698J KNQ/MNQ/YNQ
8	ANE0962000AR	CUSHION RUBBER D	1	
9	A10014J00XN	BASE	1	
10	ANE1008-3W0	RUBBER FOOT	4	
11	A10094J10HXN	CABINET BODY	1	NN-V668W NN-V668WS NN-V688W NN-V688WS
11	A10094J00NXN	CABINET BODY	1	NN-V698J NN-V698JS
12	A11405840GP	STOPPER	2	
13⚠	A200A4J20XN	OVEN	1	NN-V668W NN-V668WS (NOTE 1)
13⚠	A200A4J00XN	OVEN	1	NN-V688W NN-V688WS NN-V698J NN-V698JS (NOTE 1)
14⚠	A2011-1640	COVER	1	
15	A20344J00XN	BRACKET	1	
16	A21315870GP	PULLEY SHAFT	1	
17	ANE2177-F80	WASHER	1	
18	A22134J00XN	SENSOR BRACKET A	1	NN-V688W NN-V688WS NN-V698J NN-V698JS
19	A22144J00XN	SENSOR BRACKET B	1	NN-V688W NN-V688WS NN-V698J NN-V698JS
20	A290D5080GP	ROLLER RING (U)	1	
21⚠	A300B-1640	LEFT HINGE	1	
22	A300U-1640	RIGHT HINGE	1	
23	A3097-1660	SPRING	2	
24	A3102-1830	LATCH SWITCH LEVER A	1	
25	A3103-1830	LATCH SWITCH BRACKET	1	
26	A3105-1830	LATCH BRACKET	1	
27	XTWANE4+8SW	SCREW	2	(4X8) FOR FAN MOTOR
28	A3249-1830	LATCH SWITCH LEVER B	1	
29	A400A4760JP	FAN MOTOR	1	NN-V668W KNQ NN-V668WS NN-V688W NN-V688WS NN-V698J HNKNQ/MNQ/TNE/YNQ NN-V698JS (26W)
29	A400A9760JP	FAN MOTOR	1	NN-V668W SNM NN-V698J LNK/SNM
29	A400A5180AP	FAN MOTOR	1	NN-V698J WNT (27W)
30	A4008-1640	FAN	1	
31	A40244J00XN	EXHAUST GUIDE A	1	
32	A40254J00XN	AIR GUIDE A	1	
33	A40264J00XN	AIR GUIDE B	1	NN-V688W NN-V688WS NN-V698J NN-V698JS

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
34	A40304J00XN	AIR GUIDE B	1	
35	A40314J00XN	AIR GUIDE C (U)	1	
36	A41074J00XN	EXHAUST GUIDE B	1	
37	A41444J00XN	ORIFICE	1	
38	A60304080BP	INCANDESCENT LAMP	1	NN-V668W NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/KN LNK/MNQ/SNM/TNE/YNQ NN-V698JS (20W/240V)
38	ANE6030540AP	INCANDESCENT LAMP	1	NN-V698J WNT (125V/20W)
39⚠	A606Y4J20QP	H.V.INVERTER (U)	1	NN-V668W KNQ NN-V688W MNQ/YNQ NN-V698J KNQ/MNQ/YNQ
39⚠	A606Y4J00XN	H.V.INVERTER (U)	1	NN-V668W SNM NN-V668WS NN-V688W HNE/TNE NN-V688WS NN-V698J HNE/LNK/SNM/TNE NN-V698JS
39⚠	A606Y4J00WN	H.V.INVERTER (U)	1	NN-V698J WNT
40	A607S4J00XN	STEAM SENSOR	1	NN-V688W NN-V688WS NN-V698J NN-V698JS
41	A607X4J20HN	NOISE FILTER (U)	1	NN-V668W KNQ/SNM NN-V688W NN-V698J
41	A607X4J00XN	NOISE FILTER (U)	1	NN-V668WS NN-V688WS NN-V698JS
42⚠	A6142-1450	MICROSWITCH	1	(V-16G-3C26-M) PRIMARY LATCH SWITCH
43⚠	A61425180AP	MICROSWITCH	1	(L-3C2-2)SECONDARY LATCH SWITCH
44⚠	A61458960HN	THERMAL CUTOUT	1	
45⚠	A61524000AP	SOCKET	1	NN-V668W NN-V668WS NN-V688W MNQ/TNE/YNQ NN-V688WS NN-V698J KNQ/LNK/MNQ/SNM/TNE/WNT/YNQ NN-V698JS
45⚠	A61524650APS	SOCKET	1	NN-V688W HNE.NN-V698J HNE
46⚠	A61785180AP	MICRO SWITCH	1	(L-2C2-2) SHORT SWITCH
47⚠	A62304210BP	FUSE	1	(10A)
48	A630G6520BP	HEATER A	2	NN-V668W KNQ NN-V688W MNQ/YNQ NN-V698J KNQ/MNQ/YNQ
48	A630G6520HN	HEATER A	2	NN-V668W SNM NN-V668WS NN-V688W HNE/TNE NN-V688WS NN-V698J HNE/LNK/SNM/TNE NN-V698JS
48	A630G4J00WN	HEATER A	2	NN-V698J WNT
49	A63268960JP	TURNTABLE MOTOR	1	NN-V668W NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/KNQ/LNK/MNQ/SNM/TNE/YNQ NN-V698JS (3W)
49	A63264080AP	TURNTABLE MOTOR	1	NN-V698J WNT (3W)
50	A64604J00XN	HEATER MOUNTING PLATE	2	
51	A65854J00XN	P.C.B.HOLDER	1	
52	A66264J00XN	THERMAL CUTOUT MOUNT	1	
53	A66624J00XN	GROUHDING PLATE	1	
54	A80234J00XN	SASH	1	
55⚠	A900C4J00HN	AC CORD W/PLUG	1	NN-V668W KNQ/SNM NN-V688W HNE/MNQ NN-V698J HNE/KNQ/M SNM (220-240V)
55⚠	A900C4J00XN	AC CORD W/PLUG	1	NN-V668WS NN-V688WS NN-V698JS (220V)
55⚠	A900C4J00ZP	AC CORD W/PLUG	1	NN-V688W TNE NN-V698J TNE (220V)
55⚠	A900C4J00LN	AC CORD W/PLUG	1	NN-V698J LNK (220-230V)
55⚠	A900C4J00AP	AC CORD W/PLUG	1	NN-V698J WNT (110V)
55⚠	A900C4J00MK	AC CORD W/PLUG	1	NN-V688W YNQ NN-V698J YNQ (220V-240V)
56	XTTANE4+6SX	SCREW	1	(4X6) FOR COVER
57	XTWANE4+ 10RU	SCREW	4	(4X10) FOR MAGNETRON
58	XTWANE4+12LR	SCREW	4	(4X12) FOR HINGE
59	A11274J00XN	BARRIER SHEET	1	
60	XYCA4+BE12	SCREW	1	(4X12) FOR EARTH
61⚠	2M236-M42FS	MAGNETRON	1	
62	A64504J00XN	EXHAUST GUIDE B	1	NN-V688W NN-V688WS NN-V698J NN-V698JS
63	A01574J20SN	NAME LABEL	1	NN-V668W SNM
63	A01574J00SN	NAME LABEL	1	NN-V698J SNM
63	A01574J20KN	NAME LABEL	1	NN-V668W KNQ

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
63	A01574J20XN	NAME LABEL	1	NN-V668WS
63	A01574J10HN	NAME LABEL	1	NN-V688W HNE
63	A01574J10MN	NAME LABEL	1	NN-V688W MNQ
63	A01574J10XN	NAME LABEL	1	NN-V688WS
63	A01574J10TN	NAME LABEL	1	NN-V688W TNE (THAI & ENGLISH)
63	A01574J10YN	NAME LABEL	1	NN-V688W YNQ
63	A01574J00HN	NAME LABEL	1	NN-V698J HNE
63	A01574J00KN	NAME LABEL	1	NN-V698J KNQ
63	A01574J00LN	NAME LABEL	1	NN-V698J LNK
63	A01574J00MN	NAME LABEL	1	NN-V698J MNQ
63	A01574J00XN	NAME LABEL	1	NN-V698JS
63	A01574J00TN	NAME LABEL	1	NN-V698J TNE (THAI & ENGLISH)
63	A01574J00YN	NAME LABEL	1	NN-V698J YNQ
64	A00564J00XN	H.V.CAUTION LABEL	1	
65	A10494J00XN	CUSHION RUBBER	1	
66	A10624J00XN	CUSHION RUBBER	1	
67	A02840000MK	NUMBER LABEL	1	NN-V688W YNQ NN-V698J YNQ
68	ANE0927000BV	CUSHION RUBBER B	1	
69	A12214J00XN	BODY CUSHION RUBBER	2	
70	A11744J00XN	BODY SPACER	1	NN-V668W NN-V668WS NN-V688W NN-V688WS
70	A11744J00HN	BODY SPACER	1	NN-V698J NN-V698JS

NOTE 1: Please order name label together (Except WNT model.)

17. DOOR ASSEMBLY

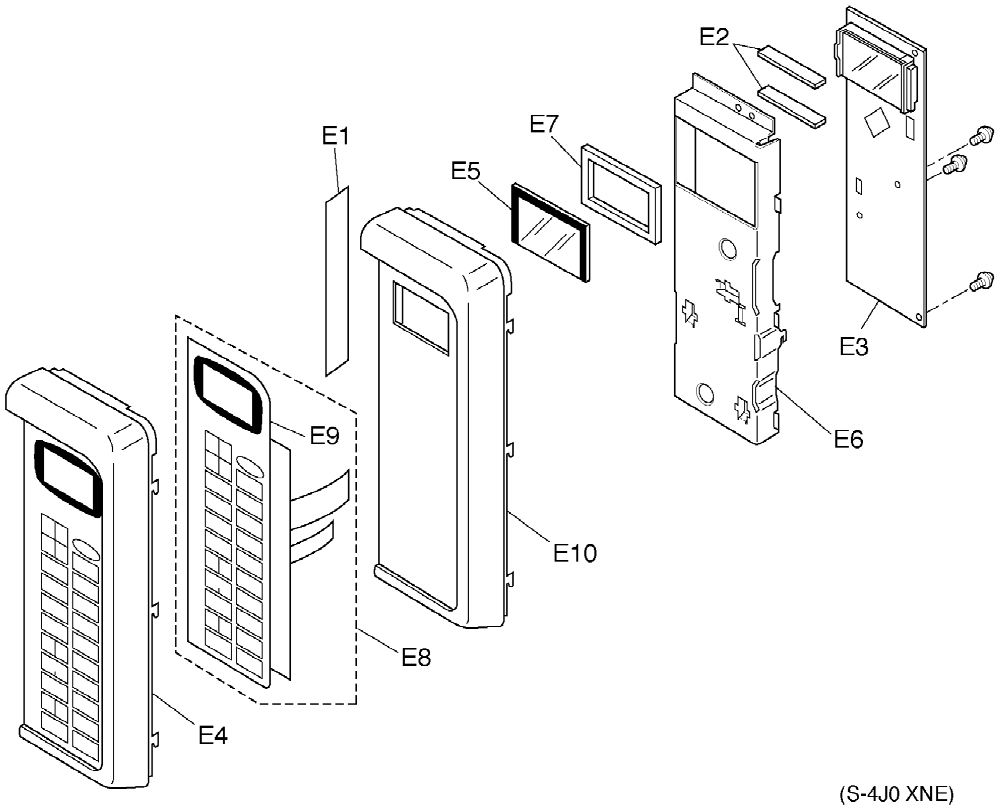


(S-4J0 XNE)

DOOR ASSEMBLY

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
D1⚠	A302K4J00XN	DOOR E (U)	1	
D2	A302A4J10HXN	DOOR A (U)	1	NN-V668W NN-V668WS NN-V688W NN-V688WS
D2	A302A4J00NXN	DOOR A (U)	1	NN-V698J NN-V698JS
D3	A3044-1640	RIGHT DOOR ARM	1	
D4	A3054-1640	LEFT DOOR ARM	1	
D5⚠	A30854J00XN	DOOR C	1	
D6	A3252-1450	DOOR ARM SPACER	1	
D7	A3230-1600	DOOR SPRING	2	
D8	XTN3+7Q	SCREW	9	(3X7)

18. ESCUTCHEON BASE ASSEMBLY



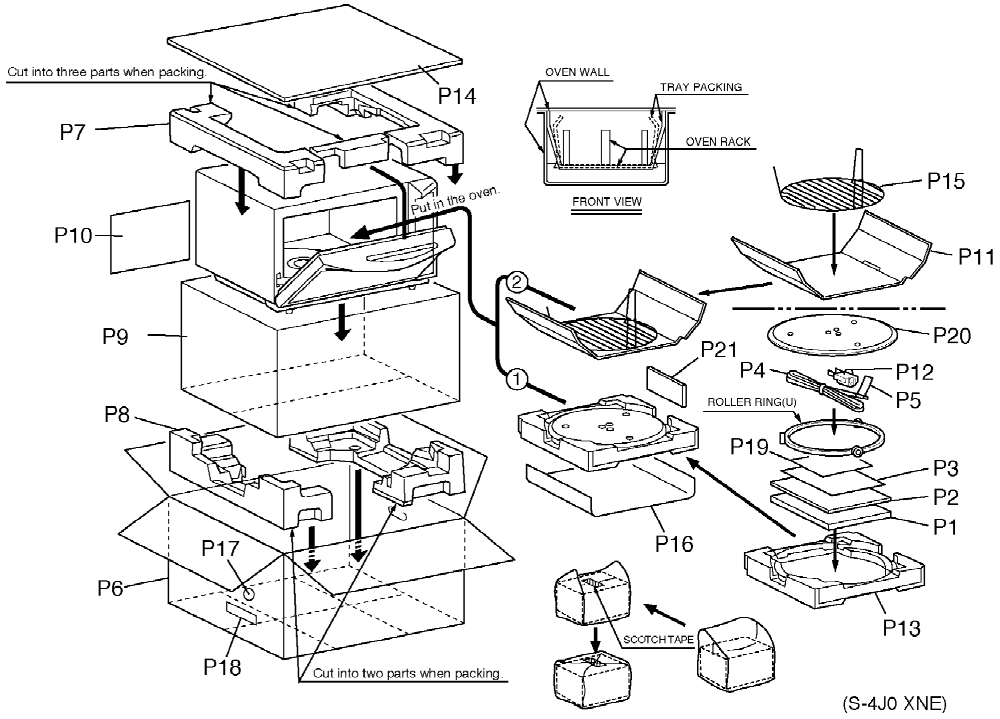
(S-4J0 XNE)

ESCUTCHEON BASE ASSEMBLY

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	A00074J00WN	NAME LABEL	1	NN-V698J WNT
E2	A64584J00XN	DISPLAY TUBE COVER	2	
E3	A603L4J20KN	D.P.CIRCUIT (U)	1	NN-V668W KNQ RTL (W/COMPONENT)
E3	A603L4J20SN	D.P.CIRCUIT (U)	1	NN-V668W SNM RTL (W/COMPONENT)
E3	A603L4J20XN	D.P.CIRCUIT (U)	1	NN-V668WS RTL (W/COMPONENT)
E3	A603L4J10HN	D.P.CIRCUIT (U)	1	NN-V688W HNE RTL (W/COMPONENT)
E3	A603L4J10MN	D.P.CIRCUIT (U)	1	NN-V688W MNQ RTL (W/COMPONENT)
E3	A603L4J10XN	D.P.CIRCUIT (U)	1	NN-V688WS RTL (W/COMPONENT)
E3	A603L4J10TN	D.P.CIRCUIT (U)	1	NN-V688W TNE RTL (W/COMPONENT)
E3	A603L4J10YN	D.P.CIRCUIT (U)	1	NN-V688W YNQ RTL (W/COMPONENT)
E3	A603L4J00HN	D.P.CIRCUIT (U)	1	NN-V698J HNE RTL (W/COMPONENT)
E3	A603L4J00KN	D.P.CIRCUIT (U)	1	NN-V698J KNQ RTL (W/COMPONENT)
E3	A603L4J00LN	D.P.CIRCUIT (U)	1	NN-V698J LNK RTL (W/COMPONENT)
E3	A603L4J00MN	D.P.CIRCUIT (U)	1	NN-V698J MNQ RTL (W/COMPONENT)
E3	A603L4J00SN	D.P.CIRCUIT (U)	1	NN-V698J SNM RTL (W/COMPONENT)
E3	A603L4J00XN	D.P.CIRCUIT (U)	1	NN-V698JS RTL (W/COMPONENT)
E3	A603L4J00TN	D.P.CIRCUIT (U)	1	NN-V698J TNE RTL (W/COMPONENT)
E3	A603L4J00WN	D.P.CIRCUIT (U)	1	NN-V698J WNT RTL (W/COMPONENT)
E3	A603L4J00YN	D.P.CIRCUIT (U)	1	NN-V698J YNQ RTL (W/COMPONENT)
E4	A800A4J00NHN	ESCUTCHEON ASSEMBLY	1	NN-V698J HNE/LNK/MNQ/TNE/YNQ
E4	A800A4J00NKN	ESCUTCHEON ASSEMBLY	1	NN-V698J KNQ/SNM
E4	A800A4J00NXN	ESCUTCHEON ASSEMBLY	1	NN-V698JS
E4	A800A4J00NWN	ESCUTCHEON ASSEMBLY	1	NN-V698J WNT (NOTE 2)
E5	A80024J00XN	ESCUTCHEON B	1	
E6	A81274J00XN	BACKPANEL	1	
E7	A82844J00XN	CUSHION RUBBER	1	
E8	A630Y4J10NHN	MEMBRANE SWITCH (U)	1	NN-V688E HNE/MNQ/TNE/YNQ
E8	A630Y4J10NXN	MEMBRANE SWITCH (U)	1	NN-V688WS XNE
E8	A630Y4J20NKN	MEMBRANE SWITCH (U)	1	NN-V688W KNQ/SNM
E8	A630Y4J20NXN	MEMBRANE SWITCH (U)	1	NN-V688WS XNE
E9	A83374J10NHN	ESCUTCHEON SHEET	1	NN-V688E HNE/MNQ/TNE/YNQ
E9	A83374J10NXN	ESCUTCHEON SHEET	1	NN-V688WS XNE
E9	A83374J20NKN	ESCUTCHEON SHEET	1	NN-V688W KNQ/SNM
E9	A83374J20NXN	ESCUTCHEON SHEET	1	NN-V688WS XNE
E10	A80344J10HXN	ESCUTCHEONBASE	1	NN-V668W NN-V668WS NN-V688W NN-V688WS

NOTE2: Please order name label together. (WNT model only.)

19. PACKING AND ACCESORIES

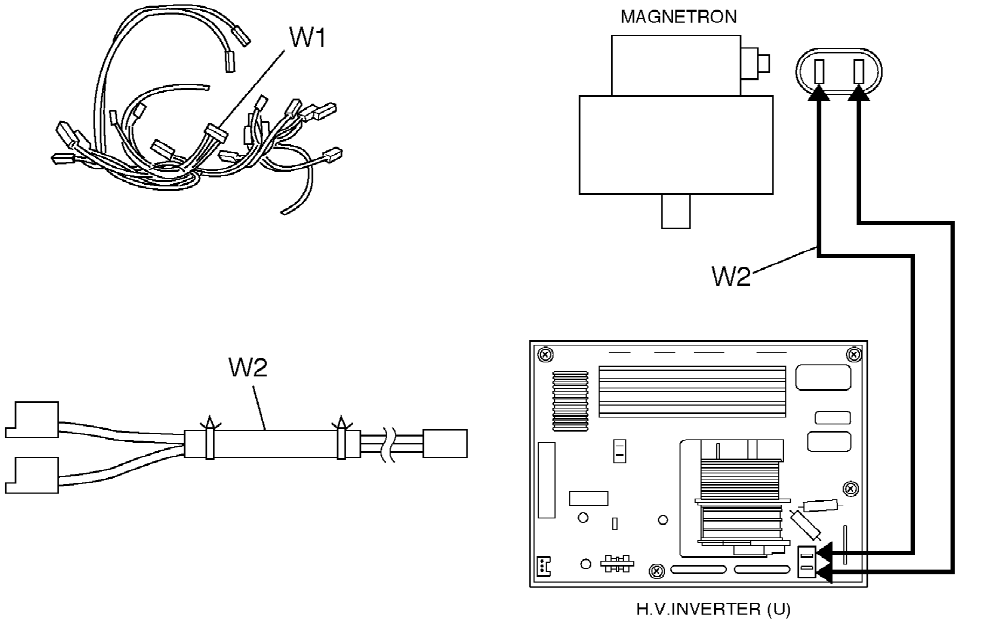


PACKING AND ACCESORIES

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	A000B5820KN	COOK BOOK	1	NN-V668W KNQ/SNM NN-V698J KNQ/SNM
P1	A000B4J00MN	COOK BOOK	1	NN-V688W NN-V698J HNE/LNK/MNQ/TNE/YNQ
P1	A000B5750WN	COOK BOOK	1	NN-V698J WNT
P2	A00034J00KN	INSTRUCTION BOOK	1	NN-V668W KNQ/SNM NN-V698J KNQ/SNM
P2	A00034J10XN	INSTRUCTION BOOK	1	NN-V668WS NN-V688WS
P2	A00034J00HN	INSTRUCTION BOOK	1	NN-V688W NN-V698J HNE/LNK/MNQ/TNE/YNQ
P2	A00034J00XN	INSTRUCTION BOOK	1	NN-V698J WNT NN-V698JS
P3	A00147530XN	PL CAUTION LABEL	1	NN-V668WS NN-V688WS NN-V698JS
P4	A91644000XN	EARTH LEAD	1	NN-V698J TNE/WNT NN-V688W TNE
P5	A00324040XN	EARTH CAUTION LABEL	1	NN-V688W TNE NN-V698J TNE
P6	A01024J20KN	PACKING CASE PAPER	1	NN-V668W KNQ
P6	A01024J20SN	PACKING CASE PAPER	1	NN-V668W SNM
P6	A01024J20XN	PACKING CASE PAPER	1	NN-V668WS
P6	A01024J10HN	PACKING CASE PAPER	1	NN-V688W HNE
P6	A01024J10MN	PACKING CASE PAPER	1	NN-V688W MNQ
P6	A01024J10XN	PACKING CASE PAPER	1	NN-V688WS
P6	A01024J10TN	PACKING CASE PAPER	1	NN-V688W TNE
P6	A01024J10YN	PACKING CASE PAPER	1	NN-V688W YNQ
P6	A01024J00HN	PACKING CASE PAPER	1	NN-V698J HNE
P6	A01024J00LN	PACKING CASE PAPER	1	NN-V698J LNK
P6	A01024J00MN	PACKING CASE PAPER	1	NN-V698J MNQ
P6	A01024J00SN	PACKING CASE PAPER	1	NN-V698J SNM
P6	A01024J00XN	PACKING CASE PAPER	1	NN-V698JS
P6	A01024J00KN	PACKING CASE PAPER	1	NN-V698J KNQ
P6	A01024J00TN	PACKING CASE PAPER	1	NN-V698J TNE
P6	A01024J00WN	PACKING CASE PAPER	1	NN-V698J WNT
P6	A01024J00YN	PACKING CASE PAPER	1	NN-V698J YNQ
P7	A01044J00KN	UPPER FILLER	1	NN-V668W KNQ/SNM NN-V698J KNQ/SNM

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P7	A01044J00XN	UPPER FILLER	1	NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/LNK/MNQ/TNE WNT NN-V698JS
P8	A01054J00KN	LOWER FILLER	1	NN-V668W KNQ/SNM NN-V698J KNQ/SNM
P8	A01054J00XN	LOWER FILLER	1	NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/LNK/MNQ/TNE WNT NN-V698JS
P9	A01065540AQ	VINYL COVER	1	
P10	ANE0107-500	DOOR SHEET	1	
P11	A01084J00XN	TRAY PACKING	1	
P12	A442B5750WN	PLUG	1	NN-V698J WNT
P13	A01134J00XN	TRAY STYROL	1	
P14	A01264J00XN	REINFORCE MATERIAL	1	NN-V668W KNQ/SNM NN-V668WS NN-V688WS NN-V698J KNQ/SNI NN-V698JS
P15	A06024J00XN	OVEN RACK	1	
P16	A0192-1100	PACKING	1	
P17	A02337530XN	CCEE LABEL A	1	NN-V668WS NN-V688WS NN-V698JS
P18	A02347530XN	CCEE LABEL B	1	NN-V668WS NN-V688WS NN-V698JS
P19	A04454J00HMN	MENU LABEL	1	NN-V688W MNQ NN-V698J MNQ
P19	A04454J00HTN	MENU LABEL	1	NN-V698J TNE
P20	A06014J00XN	COOKING TRAY	1	
P21	A01174J00KN	TRAY PACKING	1	NN-V668W KNQ/SNM NN-V698J KNQ/SNM

20. WIRING MATERIAL



(S-4J0 XNE)

WIRING MATERIAL

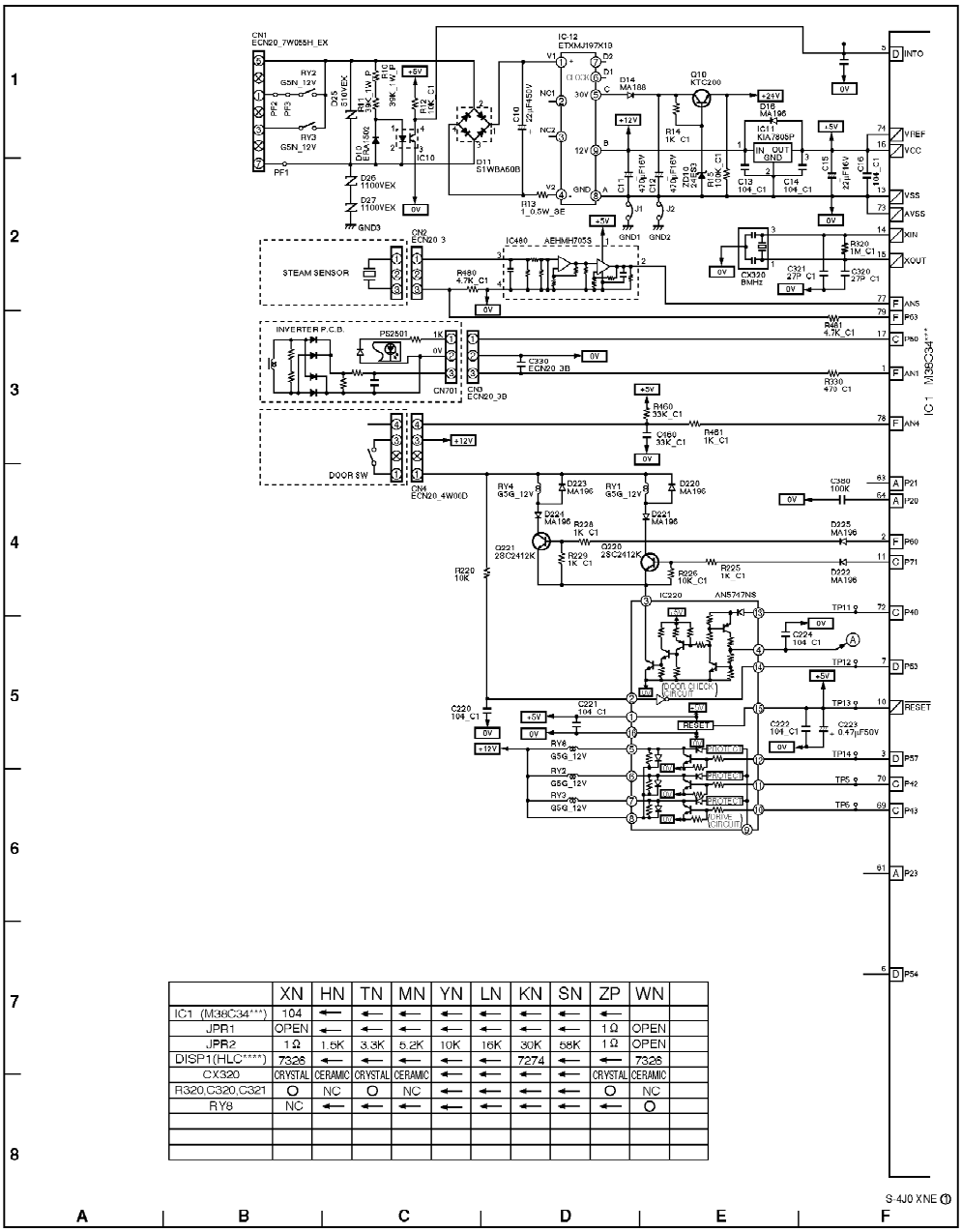
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	A030A4J00XN	LEAD WIRE HARNESS	1	NN-V668W SNM NN-V668WS NN-V688W HNE/TNE NN-V688WS NN- HNE/LNK/SNM/TNE NN-V698JS
W1	A030A4J00MN	LEAD WIRE HARNESS	1	NN-V668W KNQ NN-V688W MNQ/YNQ NN-V698J KNQ/MNQ/YNQ
W1	A030A4J00WN	LEAD WIRE HARNESS	1	NN-V698J WNT
W2	A030E4J20XN	LEAD WIRE	1	

21. REF NO. 41 NOISE FILTER (U)

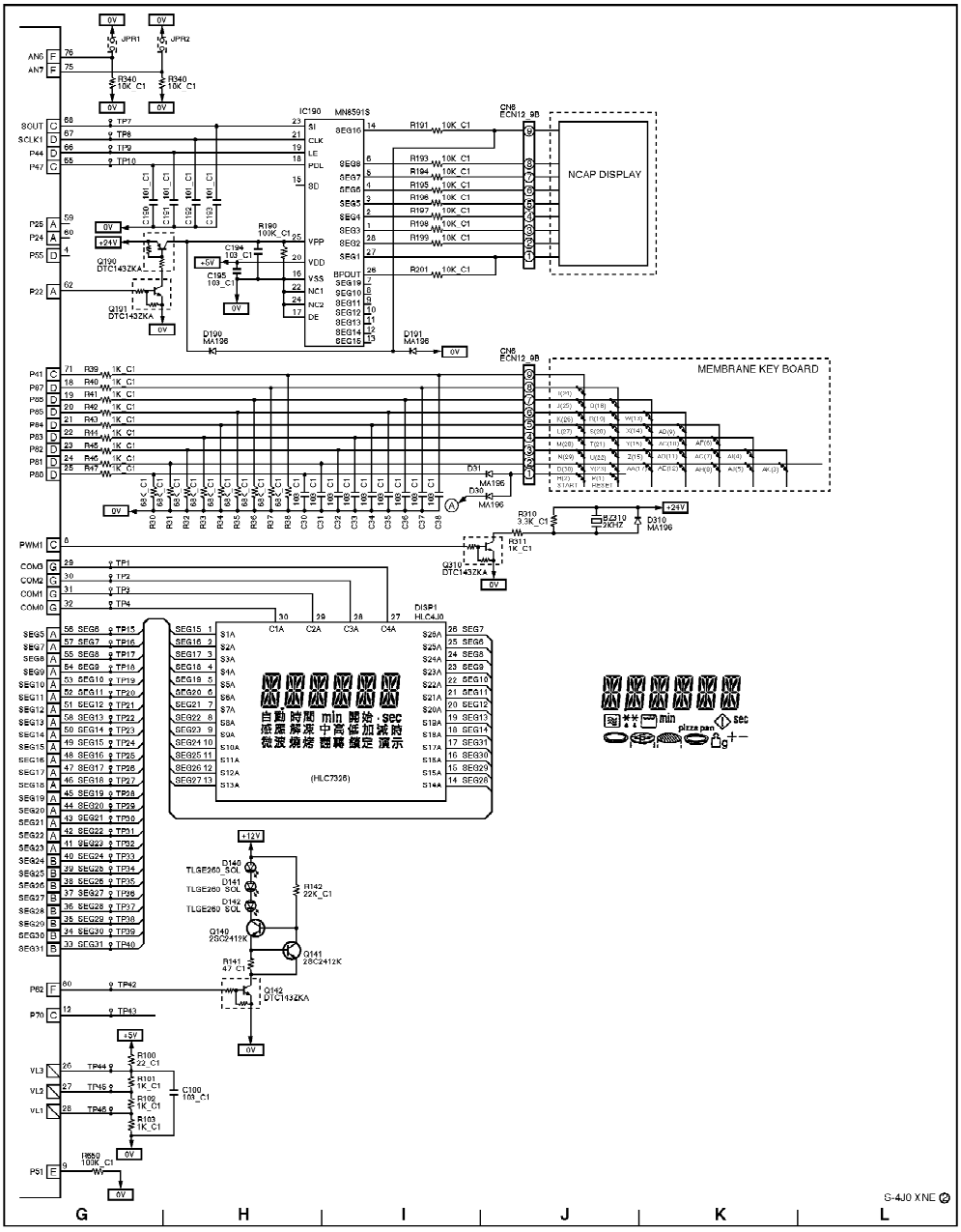
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
C1 2	AECQJ5225KX1	CERAMIC CAPACITOR	2	2.2MF
F1	A62316010BP	FUSE HOLDER	2	

22. DIGITAL PROGRAMMER CIRCUIT(NN-V698J,NN-V698JS)

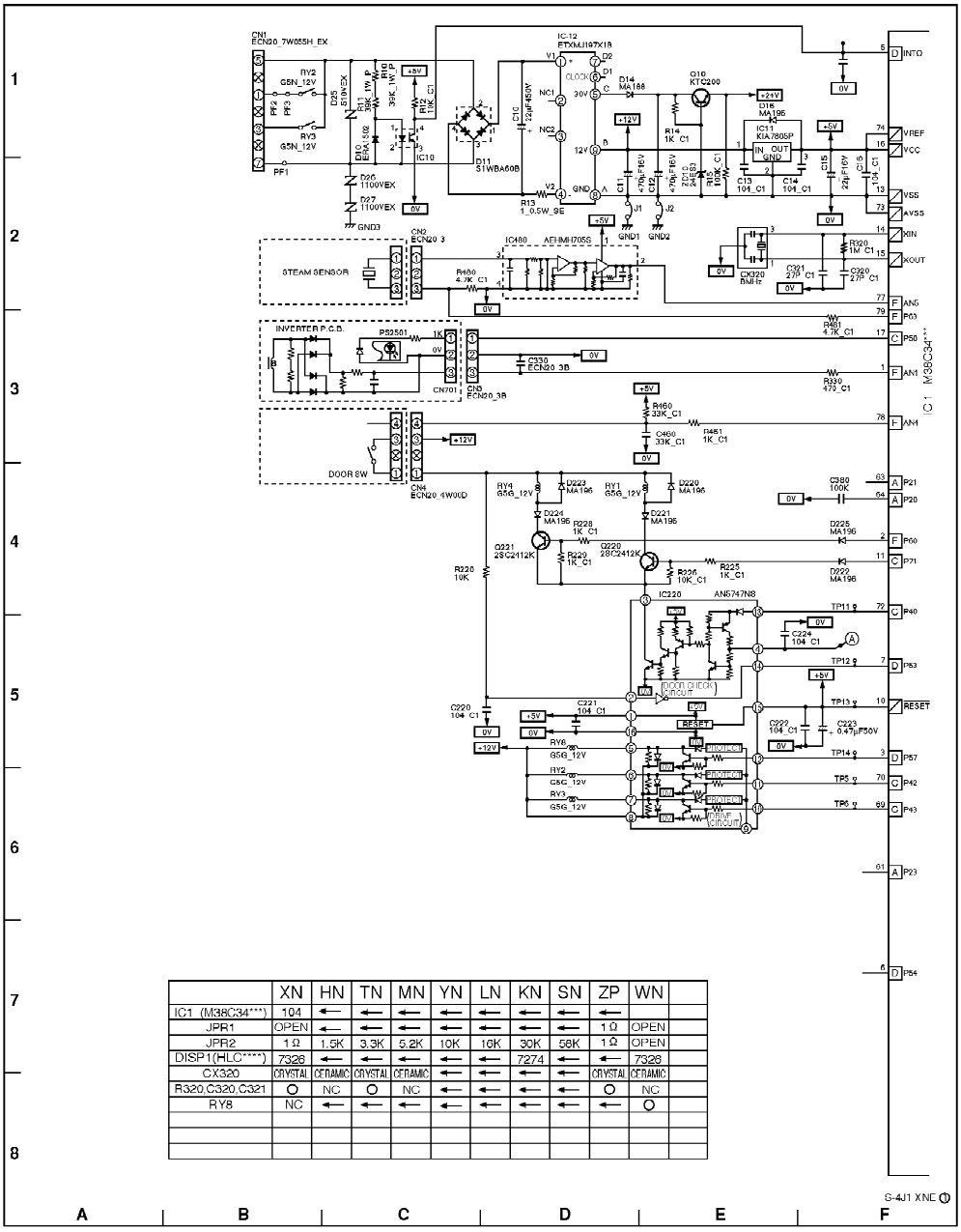
SCHEMATIC DIAGRAM



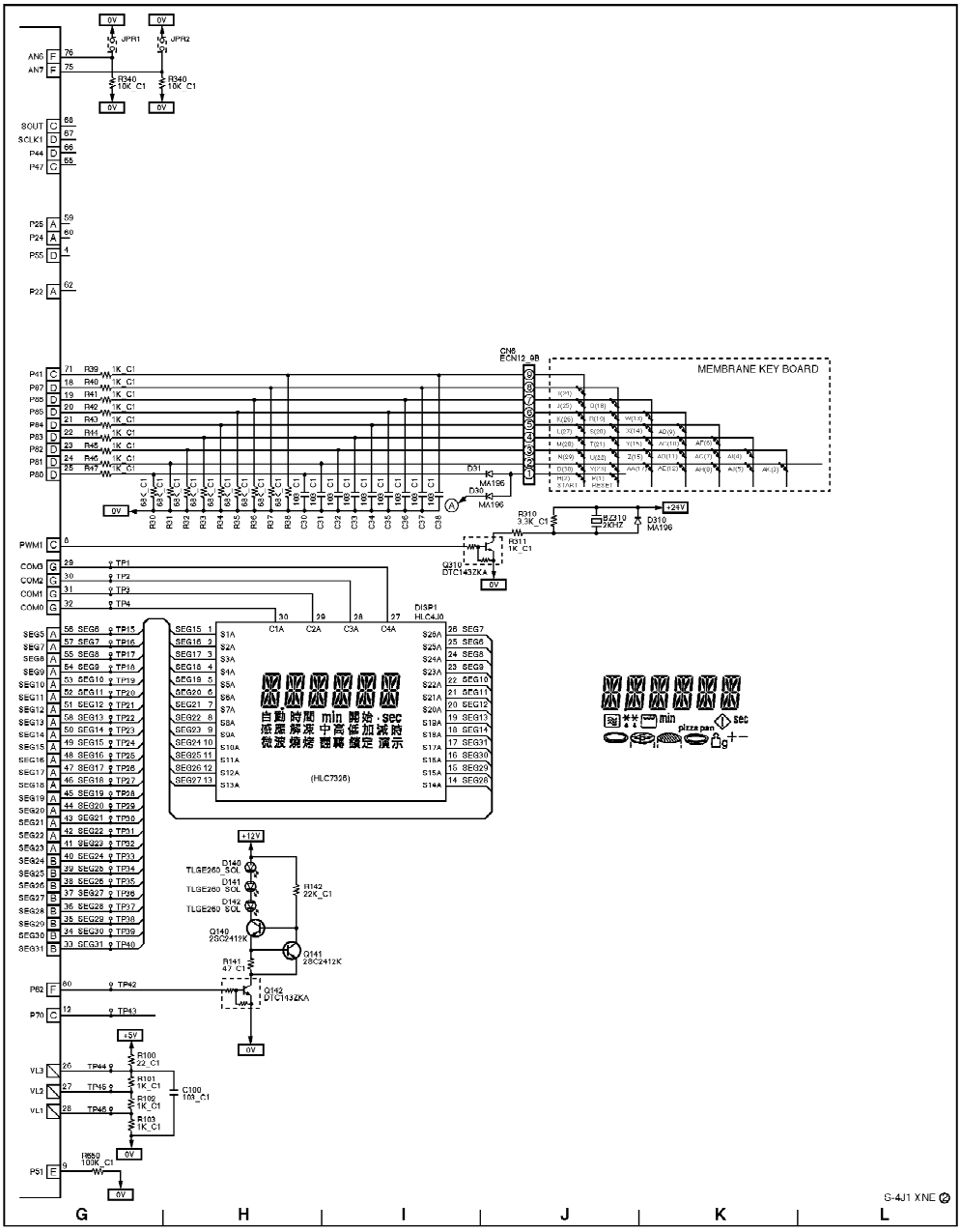
	XN	HN	TN	MN	YN	LN	KN	SN	ZP	WN
IC1 (M38C34***)	104	←	←	←	←	←	←	←	←	
JPR1	OPEN	←	←	←	←	←	←	←	1Ω	OPEN
JPR2	1Ω	1.5K	3.3K	5.2K	10K	16K	30K	56K	1Ω	OPEN
DISP1(HLC****)	7328	←	←	←	←	←	7274	←	←	7328
CX320	CRYSTAL	CERAMIC	CRYSTAL	CERAMIC	←	←	←	←	CRYSTAL	CERAMIC
R320,C320,C321	O	NC	O	NC	←	←	←	←	O	NC
RY8	NC	←	←	←	←	←	←	←	←	O



23. DIGITAL PROGRAMMER CIRCUIT (NN-V688W,NN-V688WS)



	XN	HN	TN	MN	YN	LN	KN	SN	ZP	WN	
IC1 (M38C34***)	104	←	←	←	←	←	←	←	←		
JPR1	OPEN	←	←	←	←	←	←	←	1 Ω	OPEN	
JPR2	1 Ω	1.5K	3.3K	5.2K	10K	16K	30K	56K	1 Ω	OPEN	
DISP1(HLC*****)	7328	←	←	←	←	←	7274	←	←	7328	
CX320	CRYSTAL	CERAMIC	CRYSTAL	CERAMIC	←	←	←	←	CRYSTAL	CERAMIC	
R320,C320,C321	○	NC	○	NC	←	←	←	←	○	NC	
RY8	NC	←	←	←	←	←	←	←	←	○	



24. DIGITAL PROGRAMMER CIRCUIT

PARTS LIST

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ310	AEFB22EP20TL	BUZZER	1	2.0KHZ
C10	ECA2WHG220E	ELECTROLYTIC CAPACITOR AL	1	22MF/450V/105~C
C11	EEUFC1C471B	PHOTO COUPLER	1	470MF/16V/FC
C12	ECA1HHG220B	ELECTROLYTIC CAPACITOR AL	1	22MF/50V/105~C
C13 14 16 195 220 221 222 224	AECU1F104Z25	CERAMIC CAPACITOR	8	NN-V698J NN-V698JS 0.1MF/25V
C13 14 16 220 221 222 224	AECU1F104Z25	CERAMIC CAPACITOR	7	NN-V668W NN-V668WS NN-V688W NN-V688WS 0.1MF/25V
C15	ECEA1CKA220B	ELECTROLYTIC CAPACITOR AL	1	22MF/16V
C17 30 31 32 33 34 35 36 37 38 100 194 330	AECU1F103Z50	CERAMIC CAPACITOR	13	NN-V698J NN-V698JS 0.01MF/50V
C17 30 31 32 33 34 35 36 37 38 100 330	AECU1F103Z50	CERAMIC CAPACITOR	12	NN-V668W NN-V668WS NN-V688W NN-V688WS 0.01MF/50V
C190 191 192 193	AECU1C101J50	CERAMIC CAPACITOR	4	NN-V698J NN-V698JS 0.0001MF/50V
C223	ECEA1HKAR47B	ELECTROLYTIC CAPACITOR AL	1	0.47MF/50V
C320 321	ECUV1H270JCV	CERAMIC CAPACITOR	2	NN-V668W ZPE NN-V668WS NN-V688W TNE NN-V688WS NN-V698J TNE NN-V698JS 27PF
C380	ERDS2TJ104T	CARBON FILM RESISTOR	1	100K Ω 1/4W 5%
C460	ERJ3GSYJ333V	CARBON FILM RESISTOR	2	33K 1/16W 5%
CN1	AEEMMD05507W	CONNECTOR	1	7PIN
CN2	AEEMMF00703W	CONNECTOR	1	NN-V688W NN-V688WS NN-V698J NN-V698JS 3PIN
CN3	AEEMMF00703B	CONNECTOR	1	3PIN/BLUE
CN4	AEEMMF00D04W	CONNECTOR	1	4PIN
CN5 6	AEEM09FDZBTM	CONNECTOR	2	NN-V698J NN-V698JS
CN6	AEEM09FDZBTM	CONNECTOR	1	NN-V668W NN-V668WS NN-V688W NN-V688WS
CX320	AEFOT8R00TWT	RESONATOR	1	NN-V668W KNQ/SNM NN-V688W HNE/MNQ/YNQ NN-V698J HNE/KNQ/LNK/MNQ/SNM/WNT/YNQ 8MHZ
CX320	AEYXAT49-8MA	RESONATOR	1	NN-V668WS NN-V688W TNE NN-V688WS NN-V698J TNE NN-V698JS 8MHZ
D10	AEDNERA1502	DIODE SI 1.0A	1	ERA1502
D11	AESTS1WBA60B	DIODE SI 1.0A	1	
D14	MA188-(TA5)	DIODE SI 0.2A	1	MA188

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
D16 30 31 190 191 220 221 222 223 224 225 310	AESS1N4148M	DIODE SI 0.1A	12	NN-V698J NN-V698JS 1N4148M
D16 30 31 220 221 222 223 224 225 310	AESS1N4148M	DIODE SI 0.1A	10	NN-V668W NN-V668WS NN-V688W NN-V688WS 1M1842BM
D25	ERZV10D511CS	VARISTOR	1	V10511U
D26 27	ERZV10D112C1	VARISTOR	2	V10112U
D140 141 142	AESQTLGE260	LED	3	
DISP1	AEFRHLC4F5S	DISPLAY	1	NN-V668W NN-V698J KNQ/SNM HLC7274
DISP1	AEDDHLC4J0XN	DISPLAY	1	NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/LNK/MNQ/TNE/WNT/ YNQ NN-V698JS HLC7326
IC1	AEIC8C34A104	IC	1	NN-V668W NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/KNQ/LNK/ MNQ/SNM/TNE/YNQ NN-V698JS
IC1	AEIC38C34J0W	IC	1	NN-V698J WNT
IC10	AEICP25011HL	IC	1	PS2501-1 HL 4P
IC11	AEICKIA7805P	IC	1	KIA7805P
IC12	ETXMJ197X1BG	IC	1	NN-V668W NN-V668WS NN-V688W NN-V698J NN-V698JS
IC190	MN8591S-T1	IC	1	NN-V698J NN-V698JS MN8591S
IC480	AEHMH705S	IC	1	NN-V688W NN-V688WS NN-V698J NN-V698JS
JPR1	ERD25VJ1R0T	CARBON FILM RESISTOR	1	NN-V668W NN-V668WS NN-V688W NN-V698JS 1 Ω 1/4W 5%
JPR1 2	ERD25VJ1R0T	CARBON FILM RESISTOR	2	NN-V698W 1 Ω 1/4W 5%
JPR2	ERD25VJ163T	CARBON FILM RESISTOR	1	NN-V668W KNQ NN-V698J LNK 16K Ω 1/4W 5%
JPR2	ERD25VJ303T	CARBON FILM RESISTOR	1	NN-V668W SNM NN-V698J KNQ 30K Ω 1/4W 5%
JPR2	ERD25VJ683T	CARBON FILM RESISTOR	1	NN-V668W ZPE NN-V698J SNM 68K Ω 1/4W 5%
JPR2	ERD25VJ152T	CARBON FILM RESISTOR	1	NN-V688W HNE NN-V698J HNE 1.5K Ω 1/4W 5%
JPR2	ERD25VJ622T	CARBON FILM RESISTOR	1	NN-V688W MNQ NN-V698J MNQ 6.2K Ω 1/4W 5%
JPR2	ERD25VJ332T	CARBON FILM RESISTOR	1	NN-V688W TNE NN-V698J TNE 3.3K Ω 1/4W 5%
JPR2	ERD25VJ103T	CARBON FILM RESISTOR	1	NN-V688W YNQ NN-V698J YNQ 10K Ω 1/4W 5%
Q10	AESCKTC200	TRANSISTOR SI 625MW	1	KTC200
Q140 141 220 221	2SC2412KT146	TRANSISTOR SI	4	2SC2412K
Q142 191 310	AESC43ZKE	TANSISTOR SI 300MW	3	NN-V668W NN-V668WS NN-V698J NN-V698JS

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
Q142 310	AESC43ZKE	TRANSISTOR SI 300MW	2	NN-V688W NN-V688WS
Q190	AESA14EKE	TRANSISTOR SI 300MW	1	NN-V698J NN-V698JS
R10 11	ERG1SJ393P	RESISTOR	2	39K Ω 1W 5%
R12 191 193 194 195 196 197 198 199 226 229 340 341	ERJ3GSYJ103V	RESISTOR	13	NN-V698J NN-V698JS 10K 1/16W 5%
R12 226 229 340 341	ERJ3GSYJ103V	RESISTOR	5	NN-V668W NN-V668WS NN-V688W NN-V688WS 10K 1/16W 5%
R13	ERX12SJ1R0E	RESISTOR	1	1 Ω 1/2W 5%
R14 39 40 41 42 43 44 45 46 47 101 102 103 201 225 228 311 461	ERJ3GSYJ102V	RESISTOR	18	NN-V698J NN-V698JS 1K 1/16W 5%
R14 39 40 41 42 43 44 45 46 47 101 102 103 225 228 311 461	ERJ3GSYJ102V	TRANSISTOR	17	NN-V668W NN-V668WS NN-V688W NN-V688WS 1K 1/16W 5%
R15 190 650	ERJ3GSYJ104V	TRANSISTOR	3	NN-V698J NN-V698JS 100K 1/16W 5%
R15 650	ERJ3GSYJ104V	TRANSISTOR	2	NN-V668W NN-V668WS NN-V688W NN-V688WS 100K 1/16W 5%
R30 31 32 33 34 35 36 37 38	ERJ3GSYJ683V	TRANSISTOR	9	68K 1/16W 5%
R100	ERJ3GSYJ220V	RESISTOR	1	22 Ω 1/16W 5%
R141	ERJ3GSYJ470V	RESISTOR	1	47 Ω 1/16W 5%
R142	ERJ3GSYJ223V	RESISTOR	1	22K 1/16 5%
R220	ERDS2TJ103T	CARBON FILM RESISTOR	1	10K Ω 1/4W 5%
R310	ERJ3GSYJ332V	RESISTOR	1	3.3K 1/16W 5%
R320	ERJ3GSYJ105V	RESISTOR	1	NN-V668WSNN-V688W TNE NN-V688WS NN-V698J TNE NN-V698JS 1M 1/16W 5%
R330	ERJ3GSYJ471V	RESISTOR	1	470 Ω 1/16W 5%
R480 481	ERJ3GSYJ472V	RESISTOR	2	NN-V688W NN-V688WS NN-V698J NN-V698JS 4.7K 1/16W 5%
RY1 4⚠	AEGG5G1A12	POWER RELAY	2	NN-V668W NN-V668WS NN-V688W NN-V688WS NN-V698J HNE/KNQ/LNK/ MNQ/SNM/TNE/YNQ NN-V698JS G5G-1A
RY1 4 8 ⚠	AEGG5G1A12	POWER RELAY	3	NN-V698J WNT G5G-1A
RY2 3⚠	AEBGG5N1A12	POWER RELAY	2	G5N-1A12V

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
ZD10	AESZMTZJ24C	ZENER DIODE	1	MTZJ24C